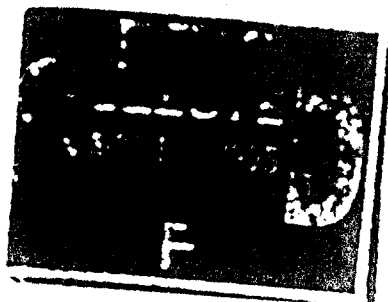


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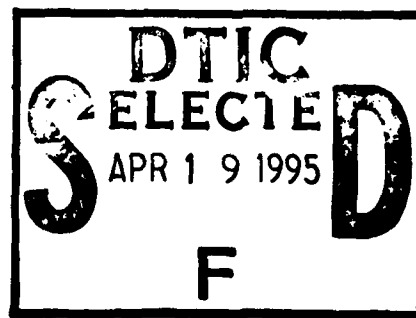
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Brig. Gen. Hugh J. Morgan, AUS (Ret.), Chief Consultant in Medicine
to The Surgeon General.

MEDICAL DEPARTMENT, UNITED STATES ARMY
INTERNAL MEDICINE IN WORLD WAR II

Volume I

ACTIVITIES OF MEDICAL CONSULTANTS

Prepared and published under the direction of
Lieutenant General **LEONARD D. HEATON**
The Surgeon General, United States Army

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W. PAUL HAVENS, Jr., M.D.

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DEPARTMENT OF THE ARMY

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Volume I

ACTIVITIES OF MEDICAL CONSULTANTS

MEDICAL DEPARTMENT, UNITED STATES ARMY

The volumes comprising the official history of the Medical Department of the U.S. Army in World War II are prepared by The Historical Unit, U.S. Army Medical Service, and published under the direction of The Surgeon General, U.S. Army. These volumes are divided into two series: (1) The administrative or operational series; and (2) the professional, or clinical and technical, series. This is one of the volumes published in the latter series.

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Foreword

This volume, the seventeenth to be published in the total series concerned with the history of the U.S. Army Medical Department in World War II, deals with internal medicine and is the first of a series of three volumes on this subject. Its nine chapters were written by thirteen authors, all of whom speak with the authority of peacetime training and experience supplemented by their wartime service as consultants in internal medicine.

Because this is the first volume of the history to relate the story of the consultant system in World War II, some comments should be made which, while specifically applicable to internal medicine, are also applicable to all other specialties.

When the first consultant reported for duty in the Office of the Surgeon General, in February 1942, he found no official statement of a consultant's functions. A Professional Services Division had existed in this Office since 1925, but its scope was limited and its functions were chiefly administrative. The organization and potentialities of the consultant system had to be established in World War II, and by trial and error.

For a number of reasons, the extension of the system was slow and difficult. The War Department, Services of Supply (later Headquarters, Army Service Forces), which had general cognizance of these matters in the Zone of Interior, was poorly informed on, or knew nothing at all about, medical needs. There were therefore long delays in setting up necessary positions. Even when malaria was incapacitating thousands upon thousands of troops, it was eight months after the request was made before a consultant in tropical medicine was appointed in the Office of the Surgeon General. The management of venereal disease was placed under preventive medicine officers, many without clinical experience in this field, while the internists, who necessarily treated it, acted as their agents. Similarly, laboratories, although their functions were almost exclusively clinical, were placed under preventive medicine control. This made for particular difficulties in the Pacific Ocean areas, where laboratory tests were frequently essential for diagnosis. Incidentally, in every theater, until the medical consultants stepped in, there was generally an excess of requests for laboratory work.

Since consultants had not been envisaged in prewar medical planning, both they and the command surgeons under whom they worked were plagued, until the end of the war, by the lack of position vacancies for them, as well as by embarrassing questions of rank. Moreover, the consultants, no matter in what command they were stationed, stressed the inconvenience and inefficiency caused by lack of effective channels of communication between themselves and the consultants in the Office of the Surgeon General. When such contacts existed, they were unofficial.

When the first consultants were appointed, there was a tacit understanding that they were to confine their activities to clinical problems. Before the war ended, these activities had been necessarily extended to a variety of other matters, including personnel, supply, and hospitalization and evacuation policies.

Personnel responsibilities, next to clinical responsibilities, became the major concern of the consultants, as might have been expected. In wartime, just as in peacetime, the availability and proper employment of qualified professional personnel determined the quality of medical care. Originally, the distribution of the limited number of such personnel was uneven and inefficient. Correction of the maldistribution was not easy, one reason being the lack of any standards of classification. The Military Occupational Specialty rating, which would have solved many questions of both assignment and promotion, did not become available until late in the war. Nevertheless, in spite of the handicaps under which they first operated, the consultants soon became the best informed officers in any command on the professional personnel in it, and officers in charge of personnel assignments soon learned not only to rely upon their advice but to ask for it.

The magnitude of the tasks of the consultants depended upon a number of considerations, including the size of the command, the number and type of installations in it, the total troop strength, and, most of all, the degree of their acceptance by the command surgeons under whom they served. This book relates frankly and realistically the troubles which arose because of the consultants' lack of experience in military matters and the initial failure of Regular Army medical officers to appreciate what they had to offer in the way of specialized medical services. From their peacetime experience, most of these consultants had a correct concept of the functions of a consultant, and, because they were imaginative and resourceful, they were soon able to translate their peacetime concepts to military necessities. In most instances, they readily adapted themselves, as they sometimes had to at first, to working in headquarters that were at best indifferent and at worst hostile, without losing their independence and individuality. It is a tribute to their tact as well as their competence that the early opposition to them gradually disappeared and that the consultant system spread from a few commands in the Zone of Interior to other commands in this country and overseas, including field armies. Until the middle wall of partition was broken down, the medical care of the sick and wounded soldier did not reach its fullest efficiency.

The goal of the consultants in internal medicine and its subspecialties was prompt, accurate diagnosis and optimum therapy, in order to reduce hospitalization time and return soldiers to duty without unnecessary loss of time, in line with the Medical Department's overall mission of maintaining an effective fighting force. The results were surprisingly good, though the degree of success naturally varied according to evacuation policies and special circumstances of the theaters.

Although the problems of every theater were fundamentally the same,

they varied widely in details. In the Pacific Ocean Area, for instance, problems were both organizational and physical. Farflung hospitals, once built, had to be equipped, staffed, and then kept supplied. Bases were isolated. Living conditions were frequently primitive. Lines of evacuation were long. There was, as one consultant put it, "a startling lack of qualified personnel," and there were few highly qualified replacements or increments during the course of the war. The most strenuous efforts of the consultants could not overcome an unavoidable misuse of limited personnel.

There were special problems in the Pacific Ocean areas as well as in the India-Burma theater even when there was no active combat. The stresses and strains of the hot, humid climate, the torrential rains, the mosquitoes and other insects, the lack of recreation, the sense of remoteness, the many frustrations, all presented the consultants with situations that involved human relations quite as much as professional matters. Their work had much to do with the fact that medical officers, fresh from civilian practice, to their everlasting credit, accepted uncongenial assignments; adapted themselves to environments in which they were neither comfortable nor happy and to regulations with which they had little sympathy; and, withal, performed an outstanding job of medical care.

Visits to hospitals and other installations were the principal means by which the consultants controlled clinical practices. All of them spent 75 percent or more of their time away from their headquarters; the consultant for the India-Burma theater traveled more than 40,000 miles. They were thus able to check completely, or spot check, the care of patients; correct errors; overcome areas of ignorance; disseminate information; observe and evaluate the performance of individual medical officers; and generally insure that the sick soldier was receiving the best possible care. The practice of all consultants of reviewing and analyzing all protocols had, as one of them noted, "a salutary anticipatory effect" on medical practice in all hospitals.

The medical consultants had to direct the care of every conceivable civilian disease. Many such diseases appeared in strange manifestations outside of their usual environment. Others had long since been controlled in the United States or did not occur at all here. Spot surveys showed the general accuracy of preinduction screening for tuberculosis, but special situations arose, as in the European theater, when Soviet prisoners of war and later Recovered Allied Military Personnel were released or when the notorious German concentration camps, such as Buchenwald, were liberated. Tuberculosis was also always a potential problem in the United Kingdom, where milk was not pasteurized, and it was the custom to keep men with minimal disease in service on limited duty. Atypical pneumonia required special consideration because it was a relatively new disease. So was infectious hepatitis, which occurred, often alarmingly, in every theater.

The native smallpox rate in the India-Burma theater was the highest in the world, but there were only 40 cases in U.S. Army personnel, all attributable to errors in vaccination.

Allergic diseases ranged from trivial disorders, such as certain dermatologic conditions, to those which were very serious, such as bronchial asthma. They accounted for much incapacity, and it was soon learned that in some tropical areas the simplest and most efficient way to handle them was to send the soldier out of the environment. Dermatologic diseases formed a highly specialized field, in which most consultants in internal medicine had little to contribute except, as one remarked candidly and ruefully, "encouragement and interest," plus the firm resolve that the postwar teaching of dermatology must be improved in all medical schools. A dermatologic consultant, along with the proper assignment of dermatologists, proved a paying investment, for in 90 percent of such conditions return to duty was possible within a 30-day period.

Malaria was no problem in the European theater until troops from the North African theater were redeployed in the fall of 1943 and the winter of 1943-44. Similarly, it was no problem in the Zone of Interior until casualties from the North African theater and the casualties from the tropical theaters began to return. It was originally a major problem, of most serious proportions, in certain areas of the Pacific, while in the India-Burma theater, probably the most malarious area in the world, 40,000 U.S. Army casualties were treated before the situation was brought under control. U.S. Army medical officers had had little practical experience with malaria, and what little experience they had had was entirely inapplicable to the disease in these areas. New lessons of both diagnosis and therapy had to be learned, particularly with respect to cerebral malaria, which accounted for most deaths from the disease. Relapses continued an almost insoluble problem until the end of the war.

The number of diseases encountered in the tropical theaters, in addition to malaria, ran a bewildering gamut. Fever of undetermined origin furnished endless diagnostic problems. Multiple diseases in the same victim were common. Because of the high native incidence and its insidious character, amebiasis was originally rampant, but it was brought under control by preventive measures, prompt diagnosis, identification of carriers, adequate therapy, and careful followup. Although cholera and plague were endemic in the India-Burma theater, not a single authentic case occurred in U.S. Army personnel. Other diseases encountered in tropical theaters included every variety of diarrheal and dysenteric disease; typical and atypical lichen planus; schistosomiasis; filariasis; dengue fever; hookworm; Japanese B encephalitis; scrub typhus; sandfly fever; and typhoid and paratyphoid fever. A number of cases of lead poisoning occurred before it was diagnosed and its origin traced to careless exposures to leaded gasoline.

Neuropsychiatry was considered originally a subspecialty of internal medicine, and even when it became a separate specialty its management was always most effective when the consultants for all specialties worked in close cooperation. In every theater the problems were the same. In the beginning, too many patients were hospitalized who would have been better off if treated at

the outpatient level. As a result, salvage was disappointing. It improved when major emphasis was placed on prevention and treatment in forward areas.

There was no administrative provision for research, and the original policy was to discourage what could have been undertaken. Of necessity, this policy changed. New methods of therapy had to be worked out for unfamiliar diseases. New agents had to be tested, such as Atabrine, penicillin, and streptomycin. Sulfonamides in tropical climates required adjunct therapy. Prior to the availability of penicillin, the decision to use massive arsenotherapy in the European theater in the management of syphilis required both courage to institute it and clinical testing. In spite of all of these endeavors, there was a regrettable loss of valuable clinical material in every theater, as well as a loss of statistical data, because the machinery for their collection and preservation simply did not exist.

An interesting part of this book is the story of the warm and helpful relations of U.S. Army medical officers and their Allied opposite numbers. In the European theater, there were 24 Inter-Allied conferences, with 220 speakers, attended by more than 6,500 Allied medical officers, and furnishing, as the chief consultant in medicine for the theater remarked, "an object lesson in international amenities." These and other conferences played an important part in the educational activities of the consultants, who followed the civilian principle that when educational standards are highest, medical care is best.

This book is a record of past wartime experience, but it has in it the plans and policies—many of them based on the experiences recorded in the history of the U.S. Army Medical Department in World War I—which must guide us in our preparations for a possible future war. It should be read with calm reflection in peacetime, to determine the measures which can most usefully be employed in wartime. It contains a frank and realistic account of errors which must not be made again. The consultant system will be instituted in toto on the outbreak of another war, for it is now an integral part of medical care in the Regular peacetime Army. In World War II, there was a steady improvement in medical care from week to week and from operation to operation. If there is a next time, improvement must come even faster.

Like other clinical volumes in this series, this volume has much in it of value for peacetime medicine.

Even to one who knows the story of medicine in World War II because he was part of it, this book makes interesting, and frequently thrilling, reading. I express my gratitude to the consultants in internal medicine and allied specialties who helped to create the achievements related in it; to those who recorded them; and, again, to those who are producing these volumes.

LEONARD D. HEATON,
Lieutenant General,
The Surgeon General.

Preface

The history of internal medicine in World War II was started in 1945 when Brig. Gen. Albert G. Love, director of the historical program of the Medical Department, requested the wartime chiefs of the various divisions and services in the Office of the Surgeon General to prepare the historical record of the activities that had been under their jurisdiction. Brig. Gen. Hugh J. Morgan, at that time Chief, Medical Consultants Division, Office of the Surgeon General, was given the responsibility of directing this project, and much is owed to his unflagging spirit by those who subsequently contributed to this history.

By the end of 1946, a great deal had been accomplished. Col. Walter Bauer, MC, Capt. John S. Hunt, MC, and Col. Francis R. Dieuaide, MC, undertook the editorial responsibilities for various sections. Some officers had been assigned to the Office of the Surgeon General to complete their manuscripts; others were requested to submit their manuscripts promptly following their release from service. However, as is not unusual in the affairs of man, a gap gradually widened between the plans and their fulfillment. The confusion attendant upon rapid demobilization and the innumerable problems of personal readjustments to civilian life tended to minimize the importance of recording experiences that occupied quite variable positions in the hearts and minds of men just out of the Army. It is, therefore, a tribute to the efforts of Drs. Morgan, Bauer, Hunt, and Dieuaide that, in the troublous postwar period, they were able to obtain most of the individual consultants' reports, 18 papers on nontropical diseases, and 12 dealing with tropical diseases. That the warmest enthusiasms of these leaders were insufficient, however, to overcome the inertia that naturally developed is not surprising, and by 1952 it was evident that, if the history were to be completed, a new approach was required.

Previous experience with certain problems encountered in preparing the history of preventive medicine had shown the value of an advisory editorial board. The success of this approach motivated Col. Calvin H. Goddard, MC, then Director of The Historical Unit, U.S. Army Medical Service, to suggest the formation of a similar board for internal medicine. Dr. Morgan, who had declined the chairmanship of this new group, was present at the first meeting on 25 October 1952 at the Office of the Surgeon General. He outlined certain of the problems encountered up to that time and gave his blessing on future activities. It is pertinent to point out here that whatever success has come of these activities owes much to the sustained interest and enthusiastic support of Dr. Morgan.

The Advisory Editorial Board which was subsequently appointed by The Surgeon General, outlined a plan for the evaluation of existing manuscripts,

including the revision of some and the rewriting of others. New authors were invited to contribute papers on subjects not previously assigned or to revise manuscripts that the original authors had abandoned. An editorial office was established at the Jefferson Medical College in Philadelphia, and a contract between this institution and the Office of the Surgeon General was made on 1 February 1953. Dr. Morgan's original plan for the history was changed to provide for one volume on the activities of medical consultants and two volumes on various diseases. This book, containing the reports of the medical consultants, represents the first fruits of the efforts of The Surgeon General to publish the history of internal medicine in World War II.

Each chapter was written by the individual consultant (or consultants) concerned, with the exception of the one on the European theater. Dr. William S. Middleton wrote the opening section of this chapter from his own viewpoint as Chief Consultant in Medicine in the European theater and, without going into their activities at length, showed how his senior consultants in their specialities fitted into the pattern. Subsequently, Col. John Boyd Coates, Jr., MC, present Director of The Historical Unit, U.S. Army Medical Service, assigned Maj. James K. Arima, MSC, Special Projects Branch, The Historical Unit, the task of describing the activities of the senior consultants in medicine in the European theater. Major Arima assembled his narrative from the documentary record, and the manuscripts were edited by the senior consultants concerned, by Dr. Middleton, and by Colonel Coates. Dr. Esmond R. Long reviewed the portions pertaining to the senior consultant in tuberculosis. At the end of their respective sections, the former senior consultants in dermatology and syphilology, neuropsychiatry, infectious diseases, and tuberculosis summarized their present (1956) thinking regarding their endeavors during the war—more than 10 years earlier.

There is inevitably some overlapping of subject matter in this volume and the two that will follow. The first describes the more general aspects of medical problems as seen in perspective by the medical consultants, the others will focus upon specific diseases. For a complete picture of some of the diseases touched on here, the reader should refer to the volumes on preventive medicine, surgery, neuropsychiatry, and miscellaneous clinical subjects in the History of the Medical Department, U.S. Army, in World War II. Of the miscellaneous clinical volumes, those on cold injury, the Army Veterinary Service, and reconditioning are especially pertinent.

Certain administrative, logistical, and operational matters are discussed insofar as they concerned the practice of clinical medicine. The point of view is personal and professional and does not necessarily coincide with the official position or policy of The Surgeon General or of the War Department. Administrative, logistical, and operational matters per se are discussed in the volumes in the administrative series of the Medical Department history or in the volumes of the Army of the United States in World War II, published under the auspices of the Chief of Military History, Department of the Army.

The statistics presented are considered "personally collected" and of "local

origin" and do not always represent official Army figures. Neither are they to be considered official Medical Department statistics since, for the history of the Medical Department in World War II, only those of Armywide significance are reviewed and checked by the Medical Statistics Division, Office of the Surgeon General. They have, however, been checked with the documentary sources indicated. The official medical statistics of the U.S. Army in World War II are scheduled for publication in the two statistical volumes planned for the Medical Department history of that war.

For convenience and clarity, the term "theater" has been used with some latitude. A theater of war is defined in the Dictionary of the United States Army Terms as that area of land, sea, and air which is, or may become, involved directly in the operations of war; a theater of operations is that portion of a theater of war necessary for particular military operations and for the administration incidental to them. The term "theater" is used in this volume in the latter sense. In the Pacific, the forces of the United States operated within what were formally designated "areas," although they were often referred to informally as theaters. There was no single "Pacific Theater of Operations" at any time during the war. The words "area" and "theater" are accordingly used interchangeably, except when necessary to refer to the proper name of a command; for example, Southwest Pacific Area. Identification of the U.S. Army commands indicated by the free use of the word "theater" is clear from the context in each chapter or is made clear in footnotes.

In World War II, most theaters were occupied or about to be occupied not only by the Army (including the Army Air Forces) and the Navy of the United States but also by the various armed services of the Allies and of friendly nations. However, in this volume portrayal of actions and persons within a given theater usually has reference only to the Army of the United States. The terms "theater surgeon" and "chief surgeon" have similar reference. There may or may not have been an individual designated at the combined (Allied) staff level as the surgeon of the theater, and there obviously were the chief medical officers of the U.S. Navy and of the Allies, whatever their formal titles may have been. But this is a history of the Medical Department of the Army of the United States, and with no intention to slight others the term "chief surgeon" and related designations are for convenience used to refer only to the chief surgeon of the highest U.S. Army command within a particular theater.

The lapse of more than a decade between the experiences recounted here and their publication does not detract from their value or interest. Actually, there is much to recommend such a hiatus since it allows opportunity for consideration and reassessment of situations in some historical perspective. It is indeed likely that the passage of time did much to encourage a more contemplative approach to many of the problems that were encountered.

The editor wishes to express his sincere thanks to the distinguished contributors who have written this history. It is obviously not easy to pick up the threads of experiences long since regarded as finished. In addition, thanks

are due to Dr. Garfield G. Duncan and the members of the Advisory Editorial Board for their constant support and to Colonel Coates for his many courtesies and vigorous assistance. In particular, appreciation is expressed to Miss Eleanor S. Cooper whose tireless and painstaking attention to the preparation and editing of these manuscripts was an invaluable aid in the compilation of this history. Mrs. Madeline W. Evans, Editorial Assistant, and Mrs. Margaret N. Kemp and Mrs. Eleanor Seiler, secretaries, also contributed substantially to the preparation of this volume. The editor also gratefully acknowledges the assistance of Mrs. Pauline B. Vivette, publications editor of the Editorial Branch, The Historical Unit, who performed the final publications editing and prepared the index for this volume.

W. PAUL HAVENS, Jr., M.D.

Prologue

The initial assignment of consultants in medicine, surgery, and neuropsychiatry in the U.S. Army during World War II was to the Office of the Surgeon General. Here, each functioned as Chief Consultant and Coordinator in matters pertaining to his field of medicine throughout the Army. After considerable deliberation on the part of a few, the commanding generals of the nine corps areas (later service commands) in the Zone of Interior accepted the recommendation that professional consultants be assigned to the offices of their chief surgeons. As oversea commands came into being, consultants were designated for them. The conspicuously successful performance of these early consultant appointees provided conclusive proof of their value to the Medical Department at home and overseas. By the end of the war, fairly complete coverage by consultants had become established throughout the Medical Department, extending from the Zone of Interior to the armies in the field.

The mission of the Medical Department of the Army in time of war is to prevent disease and injury and to provide optimum treatment for them when they occur, to the end of maintaining the lowest noneffective rate possible. The consultants, most of whom entered active service directly from civilian life and possessed little personal experience with military medicine, either clinical or administrative, related themselves to this mission in an extraordinarily effective fashion. Of necessity, their successful performances depended less upon authoritative directives and commands than upon reason and persuasion. This volume provides a review of some of their activities. It is not designed to record all of their contributions and accomplishments. Nor will it more than suggest, and this indirectly, the completeness of their loyalty to country and profession and the thoroughness of their dedication to the important medical officer assignment in which they served.

HUGH J. MORGAN,
Brigadier General, AUS (Ret.).

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CHAPTER I

Medical Consultants Division
Office of the Surgeon General

Hugh J. Morgan, M.D.

The Army of the United States in World War II was by and large a citizen's army administered at the higher levels by a relatively small number of professional soldiers. This was true for practically all arms and services, including the Medical Department which was primarily responsible for health services. A small group of career officers of the Army Medical Corps administered the complicated affairs of the Medical Department. Consultants were appointed by The Surgeon General and assigned to his office to develop medicine, surgery, and psychiatry in the Medical Department of the Army and, in a limited way, to supervise professional performance in these special fields. With few exceptions, these men were recruited from civilian life and were not from among the Regular Establishment.

The history of the development of the Medical Consultants Division, OTSG (Office of the Surgeon General), and the projection of its influence throughout the Army is a story of civilian participation in military medicine. The consultant system, beginning in the Surgeon General's Office with the assignment of the chief consultants, extended into the service commands in the Zone of Interior during the mobilization and training period and overseas with the establishment of theaters of operations. Finally, its representatives were utilized toward the end of the war by armies, corps, and divisions in combat. In this history, it would be inappropriate and unrealistic to disregard the difficulties that arose through the consultants' lack of experience with the military and the military's failure to understand clearly what the consultants had to offer. On the one side, the special problems of military medicine and, on the other side, the value of specialized medical services in hospitals and in the field had to be learned before there could evolve the system of medical, surgical, and psychiatric supervision that existed at home and in the theaters of operations at the end of the fighting in 1945.

In the pages that follow, the author breaks many times with the conventions of military reporting. This is inevitable, since he and his immediate associates and practically all of the medical consultants throughout the Army were products of civilian medicine. It is thought that the value of this volume will be enhanced if it reflects accurately both failures and achievements, both helps and hindrances, at the inception and during the development and operation of the medical consultant system in the Surgeon General's Office and in the Army Field Establishment.



FIGURE 1.—Brig. Gen. Charles C. Hillman, Chief, Professional Service Division, Office of the Surgeon General, 13 April 1942.

BEGINNING OF THE CONSULTANT SYSTEM

Chief Consultant in Medicine

On 1 January 1942, Dr. Hugh J. Morgan received a communication from Col. (later Brig. Gen.) Charles C. Hillman, MC (fig. 1), Chief, Professional Service Division, OTSG, inviting him to become a member of the Professional Service Division with the title of Chief Consultant in Medicine to The Surgeon General in the grade of colonel. The letter outlined the duties of this assignment as follows: "With the increased tempo of military matters, expansion of the Professional Service Division to provide for separate subdivisions of medicine, surgery, and neuropsychiatry appears desirable. It is contemplated that the Chief of each subdivision will be the Chief Consultant and Coordinator in matters pertaining to his field of medicine throughout the Army." On 11 February 1942, Colonel (later Brigadier General) Morgan and his personally selected assistant, Capt. (later Col.) Harrison J. Shull, MC, reported for duty to Maj. Gen. James C. Magee, The Surgeon General, and were assigned to the Professional Service Division.

Although he was strongly supported by his immediate superior, General Hillman, it was necessary for Colonel Morgan to make his way in the Surgeon



FIGURE 2. Brig. Gen. W. Lee Hart, seated, center, and key members of his Eighth Service Command medical staff.

General's Office. He participated in certain problems *immediately*, assisting in the formulation of physical standards for induction into the Army and in the selection of new drugs and special items of medical supply. He attended meetings of committees of the National Research Council concerned with internal medicine. In those early days, however, the professional consultants were expected to confine their duties rather narrowly to clinical problems. There was slow acceptance of the concept that they should recommend the duty assignments of Medical Corps specialists or should take initiative in matters directly affecting medical care, such as medical supply and hospitalization policy. Time and effort had to be expended in a process of mutual enlightenment between the newly commissioned consultants and the seasoned Medical Corps officers in the Surgeon General's Office. The latter, although experienced in the ways of the Army, were not always cognizant of the ways in which professional consultation could best be used, either in administrative medicine or at the bedside.

The peacetime Army of the thirties had recognized no need in its medical operations for a consultant service, although such a service had functioned in World War I. Revival of position assignments by General Magee met with the indifference, occasionally the frank opposition, of many officers in pivotal positions outside the Surgeon General's Office and of some inside it. There were notable exceptions, and to these early supporters the professional consultant system, as it finally evolved, owed much. Col. Sanford W. French, MC, Surgeon, Fourth Corps Area (later Fourth Service Command), and Col. (later

Brig. Gen.) W. Lee Hart, MC (fig. 2), Surgeon, Eighth Corps Area (later Eighth Service Command), set an example for other surgeons of major commands. The prompt and enthusiastic cooperation of these two officers hastened the end of inertia.

Certainly no one in the Surgeon General's Office in February 1942 envisaged the magnitude and importance of the consultant system as it eventually functioned at the time of victory in Europe and in the Pacific. Colonel Morgan's initial staff consisted of two Medical Corps officers and one civilian clerk, housed in one small room and having no representation in any major command either in the Zone of Interior or overseas. In each of the major commands, there appeared in time as consultants in medicine an informally organized group of exceptionally qualified officers. These men had been carefully chosen, most of them by The Surgeon General with the advice of his chief consultant in medicine. In a practical sense, they were usually recognized by the Medical Department as representatives of the Surgeon General's Office, although they were, in fact, directly responsible to the surgeon of the command or theater or army and were separated from The Surgeon General and his chief consultant in medicine by zealously guarded command channels.

The mission of the Medical Department of the Army in time of war is to prevent disease and injury and to provide optimum treatment, to the end of maintaining the lowest possible noneffective rate. With this as his primary objective to reduce time lost from duty, Colonel Morgan attempted to encourage, in every way possible, prompt, accurate diagnosis and optimum therapy; to expedite administrative procedure; and to help accelerate the convalescence and return of the soldier to his military assignment physically and emotionally fit. It soon appeared that this broad concept of his functions required the establishment of broad principles governing the practice of medicine in the Army and the control of specialized personnel responsible for relating these principles to the care of patients.

In the formative days, great assistance was rendered The Surgeon General and his professional consultants by the various committees of the National Research Council. These committees provided facts and expert opinion which could serve as the basis for formation of policy regarding clinical and administrative practices. Later, Colonel Morgan established, in his own organization, branches representing important subspecialties in military medicine and assigned experts as their chiefs. Civilian consultants in medicine to the Secretary of War and to The Surgeon General were also helpful.

Much of the time of the chief consultants was occupied by many matters which were not, strictly speaking, included in their functions. For example, their early efforts to encourage an aggressive attack by hospital staffs upon the problem of excessively prolonged hospitalization after recovery from disease and injury contributed greatly to the official recognition of the importance of this matter and to the eventual establishment of a comprehensive, well-organized program for the management of convalescence and rehabilitation.

Service Command, Theater, and Army Consultants

It was evident from the beginning that delegation of responsibility by the chief consultant in medicine in the Surgeon General's Office was necessary, if the mission assigned him was in any real sense to be executed. This became obvious to all when hospitalization plans for the future were disclosed. There were in actual operation in the Army approximately 209 station hospitals, with 71,459 beds. Plans called for an additional 145 station hospitals, with 86,843 beds. The 15 general hospitals, with 14,912 beds, then in operation were to be augmented by 15 additional installations with 20,988 beds. Thus, in early 1942, firm plans for hospitals in the United States provided for a total of 384 station and general hospitals, with 194,202 fixed beds. The futility of any attempt on the part of the chief consultant in medicine to affect significantly the practice of medicine in so many hospitals scattered so widely throughout the country merely by issuing directives and bulletins from the Surgeon General's Office was apparent. Moreover, there was no provision for detailed control of assignments to key positions in these hospitals. Finally, the division of the United States into corps areas (later service commands), each a separate military command, made effective central administration of medical activities from the Surgeon General's Office impossible, since authority for centralized control did not exist.

Accordingly, on the recommendation of the consultants of the Professional Service, OTSG, The Surgeon General recommended the assignment of consultants to the surgeons of corps areas.¹ It was proposed that these officers "shall act in an inspectional and consultative capacity, and that their duties shall include the evaluation of the professional qualifications of medical personnel, appraisal of new therapeutic methods and agents, and the coordination of professional practice by local discussion with hospital staffs of such special problems as may present themselves. It is contemplated that the consultants selected shall be outstanding and nationally recognized in their respective fields."

Headquarters, Services of Supply (later Army Service Forces), approved in principle this recommendation but refused the accompanying request that corps areas be authorized an increased medical officer allotment in the grade of colonel for this purpose. Shortly thereafter, the following service command consultants in medicine were assigned: Lt. Col. (later Col.) Henry M. Thomas, Jr., MC, to the Fourth Service Command; Lt. Col. (later Col.) Walter Bauer, MC, to the Eighth Service Command; Lt. Col. (later Col.) Verne R. Mason, MC, to the Ninth Service Command; and Lt. Col. (later Col.) Edgar van Nuys

¹ (1) Letter, The Surgeon General to Commanding General, Services of Supply, 28 May 1942, subject: Coordination of Medical Service (Professional) in Corps Area Installation, with 1st Indorsement thereto. (2) Letter, The Surgeon General to Commanding General, Services of Supply, 23 June 1942, subject: Coordination and Supervision of Medical Service in Station Hospitals. (3) Letter, The Surgeon General to Commanding Generals, Service Commands, 28 July 1942, subject: Coordination and Supervision of Professional Medical Service Under Service Commands. (4) Letter, The Surgeon General to Commanding General, First Service Command, 25 Jan. 1943, subject: Assignment of Professional Consultants.

Allen, MC, to the Seventh Service Command. In due time, as hospital beds increased in number, consultants were assigned to the remaining service commands. Manning tables contained no position vacancies for consultants, and some service command surgeons were loath to accept new colonels and lieutenant colonels who would have to be absorbed in the rigidly fixed staff allotted to the surgeon's office. Moreover, the concept of a consultant in medicine, whether from a military or a professional viewpoint was new and unattractive to some service command surgeons.

Great patience and forbearance were required of some of the eminent physicians chosen to serve as consultants. Their response attests to their tolerance and devotion to duty. In rare instances, it was actually necessary to prove to the surgeon of a service command that the consultant was not a busybody, troublemaker, or impractical reformer but a physician able to help the surgeon provide optimum medical care and medical administration for the patients under his jurisdiction. To their credit, these consultants made themselves so valuable in their commands that their subsequent placement in overseas theaters and with the armies met with little or no obstruction and in some instances was insisted upon by the surgeons concerned.

Service command, theater, and army consultants were usually recommended for their assignments by The Surgeon General on the advice of his chief consultant in medicine. They were judged to be eminently qualified to organize and administer the mission entrusted to them. A loose, informal, unofficial relationship between the chief consultant and his associates in the field was the only type possible, because of command boundaries. In such a large undertaking, decentralization was, in fact, desirable. It was the duty of the consultant in the field so to relate himself to his command surgeon as to insure implementation of the policies of The Surgeon General and his chief consultant in medicine for the care of medical patients. Once assigned, he was in complete control of the development of his mission and of procedures by which to carry it out under the authority of the surgeon of the command. Inevitably, the consultants' activities in the various commands varied according to local circumstances.

The record attests to the efficiency and effectiveness with which the consultants related themselves to their missions. By precept and example, formal and informal talks and demonstrations, laborious and painstaking indoctrination of military superiors and subordinates, amazing industry, tact, patience, forbearance, and ingenuity, they carried out their missions. In some instances, regional- and subordinate-command consultants were appointed on the recommendation of the consultant in medicine to the command surgeon. An outstanding example of this type of organization in the field existed in ETOUSA (European Theater of Operations, U.S. Army), under the direction of Col. William S. Middleton, MC, Chief Consultant in Medicine, ETOUSA, and Maj. Gen. Paul R. Hawley, Chief Surgeon, ETOUSA.

From time to time, reassignments were made to carry the experience gained in one command over into another. Examples are to be found in the

assignments of the following medical consultants: Colonel Thomas who was the first service command consultant appointed and who served in the Fourth Service Command and later in the Southwest Pacific Area; Lt. Col. (later Col.) Herrman L. Blumgart, MC, who served in the Second Service Command and later in the India-Burma theater; Colonel Mason who served in the Ninth Service Command and later in the Pacific Ocean Area; Lt. Col. (later Col.) Roy H. Turner, MC, who served in the Third Service Command, in the Surgeon General's Office, and finally in the Southwest Pacific. There were similar changes in the assignments of Lt. Col. (later Col.) Walter B. Martin, MC; Lt. Col. (later Col.) Irving S. Wright, MC; Lt. Col. (later Col.) F. Dennette Adams, MC; Lt. Col. (later Col.) Alexander Marble, MC; Lt. Col. (later Col.) Eugene C. Eppinger, MC; Lt. Col. (later Col.) Garfield G. Duncan, MC; Lt. Col. (later Col.) Benjamin M. Baker, MC; Colonel Shull; and Lt. Col. Myles P. Baker, MC.

In addition to changes of assignments as part of a long-term program, devices used to disseminate professional information and to meet specific local problems as they arose included assignment of consultant from one command to temporary duty in another, and sometimes exchanges between theaters were arranged. Temporary-duty assignments to the Surgeon General's Office were often requested. For example, Colonel Marble and Colonel Duncan were assigned to OTSG to assist in preparing TB MED (War Department Technical Medical Bulletin) 168, June 1945, entitled "Diabetes Mellitus," and TM (War Department Technical Manual) 8-500, March 1945, entitled "Hospital Diets," respectively. Similarly, Col. Maurice C. Pincoffs, MC, and Col. Benjamin M. Baker from the Pacific area, and Lt. Col. (later Col.) Perrin H. Long, MC, from the Mediterranean theater, were assigned to the Surgeon General's Office to give information and exchange views with staff members on particular problems in their commands. An unusual temporary-duty assignment was that of Colonel Bauer, who was sent to Sweden when the Swedish Government requested the U.S. Government to send an Army internist to discuss with the Swedish medical profession advances made in medicine during Sweden's relative isolation because of the war.

Medical Corps officers who served as consultants in medicine in various commands are listed in appendix A (p. 829). Not all were assigned on a full-time basis. In certain of the smaller commands, an exceptionally well trained chief of medical service in a hospital might also serve as consultant in medicine for the command. This dual role was not always a satisfactory substitute for the full-time service of a professional consultant. The following commands were served by part-time consultants: Bermuda Base Command, Persian Gulf Service Command, Middle East Service Command (formerly Delta Service Command), and U.S. Army Forces in the South Atlantic (fig. 3).

When the consultants were appointed, it was anticipated that they would use different approaches and techniques in their assignments. Therefore, they were selected with the greatest care possible. The fact that the consultants held important posts in civilian medical education and practice added



FIGURE 3. Areas served by part-time medical consultants. A. Modern U.S. Army hospital in the 300-year-old British colony, Bermuda, August 1943. B. Camp Amirabad, with buildings of Persian Gulf Command headquarters in foreground, Teheran, Iran, May 1944.



FIGURE 3. Continued. C. Headquarters, Delta Service Command, Heliopolis, Egypt, February 1943.

to the obligation and responsibility of The Surgeon General and his representatives in selecting their assignments. The success of the assignments was dependent in large measure upon mutual understanding and trust between the consultants and the Surgeon General's Office. The enviable record attained by the Medical Department in the field of internal medicine during the war and the lasting appreciation of the men with whom they worked in the field are convincing and enduring testimonials to the medical consultants.

EVOLUTION OF MEDICAL CONSULTANTS DIVISION

Organization

The evolution of the Medical Consultants Division, OTSG, was slow. Reorganizations of the office, wholly or in part, were frequent.² As a result, the actual development of the organization of the chief consultant in medicine in the Surgeon General's Office into a group adequate in number and with sufficient support to function properly did not take place until late in the war.

The Medicine Subdivision, Professional Service Division, OTSG, was created on 21 February 1942. The unit, headed by the chief consultant in

² The reorganizations discussed in this section are based on (1) Office Orders, OTSG, U.S. Army, No. 87, 18 Apr. 1941, No. 310, 31 Mar. 1942; No. 411, 12 July 1943; No. 4, 1 Jan. 1944; and No. 175, 25 Aug. 1944; (2) Manual of Organization and Standard Practices, OTSG, Army Service Forces, 15 Mar. 1944; and (3) Organization Charts, OTSG, U.S. Army, 21 Feb. 1942, 26 Mar. 1942, 24 Aug. 1942, 10 July 1943, 3 Feb. 1944, and 24 Aug. 1944.

medicine, had to function under the Professional Service Division. This arrangement was not satisfactory. Problems exclusively professional in nature, such as policies concerned with diagnosis and treatment, arose constantly as the tempo of the war increased and the Army expanded. All communications and memorandums to or from the Medicine Subdivision relative to these matters had to pass through the administrative channels of the Professional Service Division before reaching either The Surgeon General or other divisions of the office. Although the officers of Professional Service Division were cooperative and sympathetic, the mechanics of this arrangement retarded decisions and administrative actions.

On 26 March 1942, in a general reorganization of the Surgeon General's Office, the Professional Service Division became the Professional Service, and the Medicine Subdivision became the Medicine Division with an organizational chart providing for branches in tropical diseases, tuberculosis, general medicine, and specialized medicine. These branches were not actually put into operation, with qualified personnel assigned to them, until much later.

Another general reorganization took place on 24 August 1942. Five main services were created, including one designated Professional Services. The Medicine Division was redesignated Medicine Branch of the Medical Practice Division, which in turn functioned as one of the divisions of Professional Services. Medicine Branch retained as sections its former branches, and Colonel Morgan remained its chief, while continuing his duties as chief consultant in medicine in the Surgeon General's Office. On 4 November 1942, Col. Arden Freer, MC, who had been Chief, Medical Service, Walter Reed General Hospital, Washington, D.C., was appointed Director, Medical Practice Division, OTSG. In spite of Colonel Freer's consideration and understanding, this addition of still another administrative echelon was a further complication. Colonel Morgan repeatedly sought to obtain for the Medicine Branch a position of greater independence, one having more direct approach to The Surgeon General and thus being better able to meet promptly the pressing needs of the growing Army.

On 12 July 1943, Lt. Col. (later Col.) Esmond R. Long, MC, who had become Chief, Tuberculosis Section, Medicine Branch, and Chief Consultant in Tuberculosis to The Surgeon General, was appointed Chief, Medicine Branch. This change was designed to give the chief consultant in medicine in the Surgeon General's Office greater freedom from routine administration and easier access on professional matters to the chief of Professional Service and to The Surgeon General. General Morgan continued to initiate and direct the overall policies of the Medicine Branch. On 1 January 1944, as part of another general reorganization, the Medicine Branch was designated the Medicine Division, with General Morgan as director.

Finally, on 25 August 1944, the Professional Service was dissolved, and the Medicine Division was renamed Medical Consultants Division and placed in an independent status functioning directly under The Surgeon General. At this time, the division was composed of four branches: General Medicine

Branch, Tuberculosis Branch, Tropical Disease Treatment Branch, and Communicable Disease Treatment Branch, the last named having been established in lieu of the Specialized Medicine Branch. A final addition to the organizational setup was the position for a consultant in dermatology, which was filled in March 1945. With this structure and direct relationship to The Surgeon General, the division continued its activities through V-E and V-J Days.

Thus, in order to carry out the mission of the chief consultant in medicine in the Surgeon General's Office, with the many routine administrative responsibilities which had been made a part of his mission, a staff which in the beginning had consisted of two medical officers had been gradually enlarged to six. It was clear at the outset that the activities for which the chief consultant was held responsible could be performed only by men specially trained in such activities. As need became urgent, trained men were usually found but not without delay or, occasionally, out-and-out obstruction.

Obstructions can be explained to some extent by the fact that Services of Supply, under which the Medical Department operated, controlled medical personnel with an iron hand. The Surgeon General's Office was handicapped on many occasions by edicts defining the exact personnel-allotment ceiling under which its operation had to be carried out and by the fact that these edicts originated from an authority which, one is forced to conclude, was often poorly informed if not completely ignorant of the needs of the Office.

The Medical Consultants Division had more than its share of difficulties. For example, there was delay in excess of 6 months in obtaining an officer thoroughly familiar with tropical medicine, although the need for expert guidance in this field had been long foreseen and repeatedly urged. Another delay, in obtaining a position vacancy for an officer to act as chief of a communicable disease treatment branch, at one time threatened the very existence of the Medical Consultants Division as it was at that time constituted. In addition, one may cite the extraordinary way in which the management of venereal disease treatment was handled.

In the field, the treatment of venereal diseases, with their high noneffective rate, was an enormous problem and, because of the rapid developments in therapy, urgently required proper direction. The Venereal Disease Subcommittee of the National Research Council was one of the most active, effective, and important organizations in contact with The Surgeon General. It became mandatory that the Surgeon General's Office place the responsibility for the care of venereal diseases in the hands of those professional men best equipped to master the new methods and techniques recommended to the Army by the Venereal Disease Subcommittee and guide these men in their application of the newer knowledge as it became available. Colonel Morgan took the position that the treatment of venereal diseases was, in fact, a problem of internal medicine; that the local treatment commonly employed at the time was harmful; and, therefore, that the responsibility for treatment should be given to medical rather than to surgical (urological) experts. This position was readily agreed to by Col. (later Brig. Gen.) Fred W. Rankin, Chief

Consultant in Surgery to The Surgeon General, and in due time The Surgeon General enunciated this as official policy. Nevertheless, it was impossible to obtain approval for the assignment of an officer who was a specialist in this field. Since the Preventive Medicine Service, Office of the Surgeon General, on the other hand, had the personnel available, The Surgeon General, on the recommendation of Colonel Morgan, in November 1942 created a venereal disease treatment section in the Venereal Disease Control Branch of the Preventive Medicine Service,³ and throughout the remainder of the war this clinical activity was administered in that service.

Fortunately, Lt. Col. (later Col.) Thomas B. Turner, MC, Director, Venereal Disease Control Branch, OTSG, recognized that it would be impossible for his field representatives actually to supervise treatment. Most of the venereal disease control officers had had public health training and little or no clinical experience. Therefore, the consultants in medicine in service commands, theaters, and armies served as agents for implementation of venereal disease treatment policy enunciated by Colonel Turner and Colonel Morgan. The Medical Consultants Division participated in all relevant activities, such as publication of official policy in War Department circulars and TB MED's; establishment of treatment centers for neurosyphilis; clinical trials of various methods of management of gonorrhea, including duty-status treatment; and treatment of syphilis and gonorrhea with penicillin. In the field, the medical consultants, in their regular visits to Army hospitals and other Medical Department installations, consulted on the clinical management of venereal disease. Excellent Armywide liaison in the important functions of control and treatment existed between venereal disease control officers and medical consultants, and the lowered noneffective rate from venereal disease achieved during World War II represented a triumph in military medicine. Nevertheless, The Surgeon General's organization for the supervision of venereal disease treatment was a glaring example of administrative inconsistency and improvisation (p. 24).

These references to some of the organizational difficulties which General Morgan encountered in the Surgeon General's Office are not cited in a spirit of criticism of the Medical Department. They arose usually because of the position of the Medical Department in relation to the Army as a whole. They were the result of restrictions and controls imposed upon The Surgeon General by higher authority, which, often enough, was uninformed and unsympathetic. That The Surgeon General was held responsible for prevention and optimum treatment of disease and injury in the Army but was not provided the authority with which to carry out this mission is an incontrovertible fact. It will be attested to by experienced medical officers throughout Army. As a partial explanation of this situation, suffice it to say that the physician and surgeon, conditioned to professional and social relation-

³ (1) Memorandum, Brig. Gen. Charles C. Hillman for The Surgeon General, 3 Nov. 1942, subject: Additional Function for Venereal Disease Control Branch. (2) Office Order No. 466, OTSG, U.S. Army, 12 Nov. 1942, subject: Venereal Disease Treatment Transfer Functions.

ships as they exist for the doctor in civilian life, often found the military setting a trying one in which to practice their profession. In fact, it can be said that the Medical Department as a whole experienced similar difficulties in its relationship to the Army which it served.

Personnel

The problem of personnel as part of the overall problem of organization has been indicated in broad outline as it existed in the Surgeon General's Office and as it was gradually resolved. It had been clear at the beginning that the Medicine Subdivision, to function fully, required experts in several medical specialties to collect and collate information, outline policies in diagnosis and treatment, initiate and supervise research, and aid in dissemination of recently acquired knowledge. As early as March 1942, a memorandum had been sent to the Executive Officer, OTSG, stating the minimum requirement to be five officers. Nevertheless, expansion of the staff and activities of the Medicine Subdivision never kept pace with the expanding needs of the huge army in training.

Tuberculosis Branch.—It was recognized early by General Hillman that tuberculosis was an extremely important problem for the Army despite careful screening at induction centers. Therefore, Dr. Esmond R. Long, Director, Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis, Professor of Pathology, University of Pennsylvania, Philadelphia, Pa., and Chairman, Subcommittee for Tuberculosis, Division of Medical Sciences, National Research Council, was asked to accept a commission in the Army, and on 1 July 1942, was assigned to the Professional Service Division, OTSG, as chief of the Tuberculosis Branch, Medicine Subdivision, with the rank of lieutenant colonel. The Tuberculosis Branch was concerned with all problems related to the diagnosis, treatment, and disposition of military personnel with tuberculosis. In a memorandum to The Surgeon General dated 13 July 1942, the urgent need for an assistant to Colonel Long was outlined. None was assigned. Finally, in October 1942, through an informal arrangement with the Army Medical Center, Walter Reed General Hospital, one of its medical officers, Capt. (later Lt. Col.) William H. Stearns, MC, was placed on special duty in the Tuberculosis Branch, OTSG, while he was still assigned to the Center. It was not until 17 March 1943 that Captain Stearns was officially assigned to the Surgeon General's Office. Such expedients were necessary because The Surgeon General lacked full control in the management of medical personnel and was thus obliged to operate under fixed ceilings as to numbers and rank.

Tropical Disease Treatment Branch.—In the Pacific areas, many U.S. troops were certain to be exposed to various tropical diseases. Although malaria was the outstanding problem, other diseases common in the Tropics were expected to affect significant numbers. On 21 July 1942, in a memorandum to the Executive Officer, Professional Service Division, OTSG, Colonel Morgan asked that a specialist in the clinical aspects of tropical medicine be assigned to the Medicine Subdivision. No action was taken. On 2 November



FIGURE 1. Consultants in medicine, Office of the Surgeon General.

(Left, top) Col. Harrison J. Shull, MC, Chief, Medicine Branch, Office of the Surgeon General; and Consultant in Medicine, Office of the Surgeon, Sixth U.S. Army.

(Left, center) Col. Francis R. Diemaide, MC, Chief, Tropical Disease Treatment Branch, Office of the Surgeon General.

(Left, bottom) Lt. Col. Clarence S. Livingood, MC, Chief, Dermatology and Syphilology Section, 20th General Hospital, USAFIBT; and, later, Consultant in Dermatology to The Surgeon General.

(Right) Col. Esmond R. Long, MC, Chief Consultant in Tuberculosis to The Surgeon General.

1942, Colonel Freer, at Colonel Morgan's request, sent a memorandum to General Hillman requesting the assignment and outlining the reasons for urgency. On 18 November, General Hillman repeated the request in a memorandum to The Surgeon General. No action was taken. Efforts to obtain appointment of a suitable officer were renewed on 5 February 1943, when war in the Pacific was very active and malaria had become an enormous problem in New Guinea. Urged by General Morgan, Colonel Freer again wrote a memorandum requesting the assignment of a specialist and suggesting Dr. Francis R. Dieuaide, then Clinical Professor of Medicine, Harvard Medical School, Boston, Mass., and formerly Professor of Medicine, Peking Union Medical College, Peking, China. The request was granted 8 months after its initiation, and, on 22 March 1943, Dr. Dieuaide was finally commissioned lieutenant colonel and was assigned to the Medical Practice Division, OTSG, as chief of the Tropical Disease Section, Medicine Branch.

There were now five officers assigned to the Medicine Branch of the Medical Practice Division. These were General Morgan, director; Colonel Long, Tuberculosis Section chief; Captain Stearns, assigned to the Tuberculosis Section; Colonel Shull, General Medicine Section chief; and Colonel Dieuaide, Tropical Disease Treatment Section chief (fig. 4). On 1 January 1944, the Medicine Branch was redesignated the Medicine Division of Professional Services. When Colonel Long became chief consultant in tuberculosis functioning directly under the chief of Professional Services, Captain Stearns became chief of the Tuberculosis Branch. The other sections, now called branches, remained unchanged.

Communicable Disease Treatment Branch.—When Colonel Long left the Medicine Division, a numerical vacancy was opened. To fill this vacancy General Morgan proposed appointment of a chief of a communicable disease treatment branch. On 2 February 1944, in a memorandum to The Surgeon General, General Morgan outlined the functions of such a branch and indicated the need for it, mentioning the problems in relation to infectious hepatitis, rheumatic fever, gonococcal infections, and other communicable diseases. He named Col. Roy H. Turner then Consultant in Medicine, Third Service Command, and formerly Associate Professor of Medicine, Tulane University Medical School, New Orleans, La., as his choice to fill the position. No action was taken, and on 28 February 1944, the recommendation was made again but was disapproved by The Surgeon General. On 15 April 1944, another memorandum to The Surgeon General sought to have Colonel Turner assigned to the Medicine Division. The request, at first refused, was finally approved on 19 April 1944, and Colonel Turner was assigned as Chief, Communicable Disease Treatment Branch, Medicine Division, OTSG, on 4 May 1944.⁴

Consultant in Dermatology.—Diseases of the skin were common throughout the Army, especially in the Tropics. In a memorandum dated 29 November 1944, General Morgan requested that a consultant in dermatology be assigned

⁴ Office Order No. 94, OTSG, U.S. Army, 4 May 1944, subject: Chief, Communicable Disease Treatment Branch, Medicine Division.

to the Surgeon General's Office. This request was approved, and Maj. (later Lt. Col.) Clarence S. Livingood, MC, (fig. 4) then assigned to the 20th General Hospital, located in Ledo, Burma, reported for duty in the Medical Consultants Division, OTSG, on 30 March 1945.

The appointment of Major Livingood brought to six the number of officers assigned to the Medical Consultants Division. The number remained the same until demobilization began although several changes were necessitated by the policy of making officers of the division available for oversea assignments. Major Stearns was released on 2 January 1945, to become chief of the medical service of a numbered general hospital, and Capt. John S. Hunt, MC, replaced him as Tuberculosis Branch chief. Colonel Shull was released on 22 May 1945, to become Consultant in Medicine, Sixth U.S. Army, then in the Pacific, and was replaced by Maj. (later Lt. Col.) Frederick T. Billings, Jr., MC, as General Medicine Branch chief. Colonel Turner was released on 12 July 1945, to become Consultant in Medicine to the Surgeon, Army Forces, Western Pacific, and, later, Chief Consultant in Medicine to the Surgeon, U.S. Army Forces, Pacific. He was replaced by Colonel Eppinger as Communicable Disease Treatment Branch chief. Colonel Dieuaide remained in the Medical Consultants Division and became its deputy director. He continued to serve as chief of the Tropical Disease Branch.

CLASSIFICATION AND ASSIGNMENT OF PERSONNEL

Appropriate allocations of personnel with special qualifications, essential in maintaining high standards of medical care, required familiarity with the requirements of the position vacancies to be filled and accurate knowledge of the qualifications of the men available. Early in the program, difficulty was encountered in assigning specialized personnel in Zone of Interior general hospitals, which were under the direct control of The Surgeon General. It was also difficult to assign specialists to the service commands for reassignment to station hospitals and other service command installations.⁵ This difficulty resulted from the apathy of some officers in the Personnel Service, OTSG, in regard to specialization in the practice of medicine. The Personnel Service was engaged in the enormous job of assigning general medical officers for the rapidly expanding Army. Moreover, no standardized Armywide classification of medical officers as to specialties existed in early 1942, and no use was being made of a classification of civilian internists furnished by civilian medical organizations.⁶

⁵ As soon as service command consultants were appointed, the general hospitals located in their command received from them as much attention and consultation and personnel management as the station hospitals. Efforts were made to establish close liaison between the service command consultant in medicine and the Medical Consultants Division, OTSG, to maintain coordination and integration in all matters including the assignment of specialized personnel.

⁶ Before the outbreak of World War II and as part of preparation for the emergency, the Committee on Medicine of the National Research Council, in cooperation with the American College of Physicians, provided The Surgeon General of the Army with a carefully prepared list of the internists in the United States. This classification furnished a professional evaluation of each person as to his potentialities for assignment as, ward officer, section chief, assistant chief, or chief of service. On his arrival in the Office of the Surgeon General, Colonel Morgan procured this list from the files of the Personnel Service. The Medical Consultants Division and the Personnel Service also made extensive use of it during the early months of the war.

Colonel Rankin and Colonel Morgan, in 1942, participated actively in The Surgeon General's officer-procurement program. They visited civilian medical society meetings and insisted upon the careful, considered assignment, by The Surgeon General, of the specialized personnel procured. These personnel functions were included in the duties of the chief consultants in the official definition of the functions of the Medicine and Surgery Subdivisions, as stated in Office Order No. 87, OTSG, U.S. Army, 18 April 1942. This order read in part as follows: "* * * approval, by liaison with the Military Personnel Division, of selection of personnel for key professional positions." Gradually, these personnel functions gained the support of the Personnel Service. The fact became recognized in the Surgeon General's Office and, subsequently, in service commands and theaters that only through control of specialized personnel could the consultants perform effectively the duties assigned them. Where this principle had the wholehearted support of the surgeon of the command and of his personnel officer, it yielded the greatest returns in improved medical care.

The final acceptance by The Surgeon General of the proposition that the Medical and Surgical Consultants Divisions should cooperate with the Personnel Service in the assignment of all individuals with special qualifications in their respective fields was basic to their success in the Surgeon General's Office and throughout the Army. Finally, the Personnel Service invited the Medical and Surgical Consultants Divisions to cooperate in establishing a classification based on evaluation of professional qualifications. Out of the deliberations which ensued, there developed, albeit belatedly, the method of placing all medical officers initially into 1 of 4 categories—A, B, C, and D—according to arbitrarily defined standards of professional training and experience. Subsequently, at appropriate intervals, the classification of each officer was to be reviewed on the basis of demonstrated ability in the Army.⁷ Because of administrative difficulties, much time was lost in instituting this method of professional evaluation. Nevertheless, the adoption and use of the classification led to great improvement in personnel management during the latter part of the war. The consultants in service commands and in oversea theaters were in an ideal position to assume responsibility for the continuing evaluation and reevaluation of medical officers to keep the classifications current.

The responsibilities of the chief consultant in medicine with regard to appropriate assignments to position vacancies were defined and accorded official recognition in Office Order No. 175, OTSG, U.S. Army, dated 25 August 1944, which stated: "Assignments of key personnel will be made only with the concurrence of the appropriate Service or Division particularly concerned with or possessing special knowledge as to the qualifications of the officers and the requirements of specialty assignments." The Surgeon General encouraged the same attitude regarding the responsibilities of consultants in medicine in service

⁷ TM 12-406, 30 Oct. 1943, Officer Classification; Commissioned and Warrant, Appendix B, Classification of Medical Corps Officers.



FIGURE 5. Mobile and fixed hospitals in the Zone of Interior and overseas. A. Expanding Station Hospital, Fort Benning, Ga. The new annex buildings extend from left to right across the photograph. The original hospital building appears in the upper right hand corner surrounded by trees. B. 69th Field Hospital, Leyte, Philippine Islands, acting as evacuation hospital, October 1944.



FIGURE 5. Continued. C. 118th General Hospital, Sydney, New South Wales, Australia, August 1944. D. 94th Evacuation Hospital, Italy, 1944.

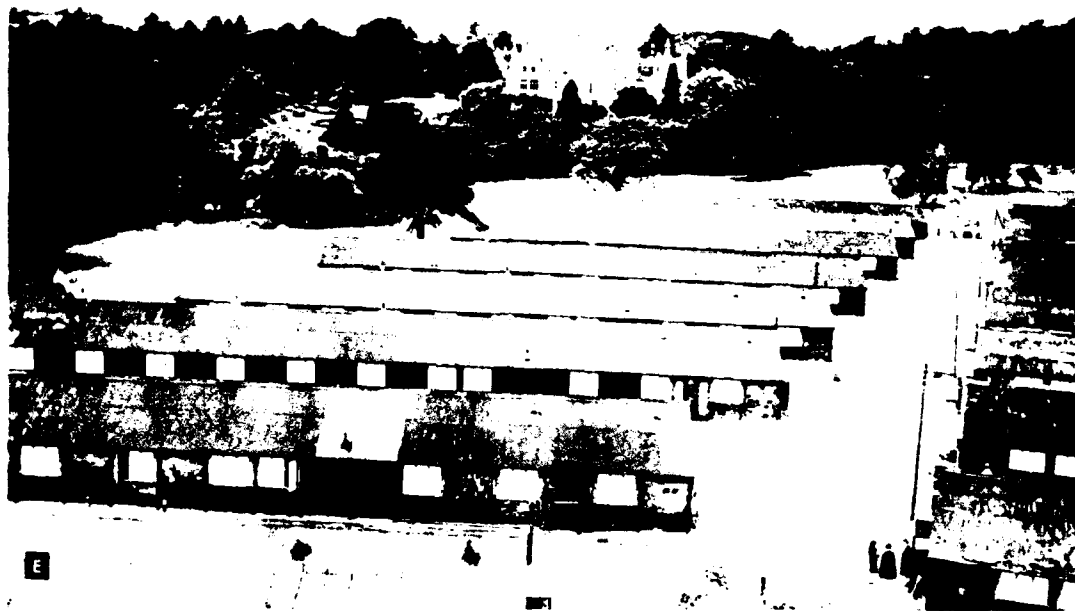


FIGURE 5. (Continued). 1. 120th Station Hospital at Tortworth Camps, Edfield, Somerset, England. A castle is shown in the distance, 5 August 1943.

commands and in overseas theaters. The degree to which this responsibility was given to the consultants in the various commands at home and overseas varied considerably. It is believed that the Medical Consultants Division, OTSG, and the medical consultants in the field best served their intended functions when they were permitted to participate directly and in a detailed fashion in the classification, evaluation, and duty assignment of the specialists in internal medicine available within their command. Experience in the war has shown that, wherever the consultant was most active in this regard, the quality of medical care was usually superior.

Tables of organization. Early in the emergency, the Medical Consultants Division was not invited to take part in the formulation or revision of tables of allotment, as the Division was concerned with specialists in internal medicine. Gradually, however, as the value of the Division's contributions to personnel management in internal medicine became recognized, consultation and advice regarding the quantitative need for specialists in the varied types of Medical Department organizations were requested.

In retrospect, it is clear that the allotment of officer personnel for medical installations of World War II placed too much emphasis upon the need for internists in the fixed hospitals, especially the general hospitals in the Zone of Interior, and too little emphasis upon needs of station hospitals in the Zone of

Interior and in mobile units in theaters of operations. The Medical Consultants Division held that the most important contribution of internal medicine, in terms of maintaining the effective strength of the Army, was the successful treatment and prompt return to active duty of the acutely ill patient. In theaters of operations, these patients normally received their initial definitive treatment in station, field, and evacuation hospitals. This fact was not given proper consideration in the staffing of these hospitals. Station hospitals in the Zone of Interior and mobile and fixed hospitals overseas that cared for actually ill patients should have received a larger number of well-trained internists (fig. 5). In time, this mistake was corrected in large measure in the station hospitals of the Zone of Interior. However, overseas, particularly in the Pacific areas, the tables of organization were adhered to. Late in the war, the resulting deficiencies were in process of being corrected by local arrangement in some evacuation and field hospitals.

CLINICAL SERVICES IN ARMY HOSPITALS

Organization of the Medical Service

At the beginning of the emergency, it was generally believed that the organization of professional services conventionally employed in civilian hospitals would function effectively in Army hospitals. The major services of medicine and surgery were outlined in TM 8-260, Fixed Hospitals of the Medical Department (General and Station Hospitals), dated 16 July 1941. The medical service of large hospitals contained sections for general medicine, communicable diseases, gastrointestinal diseases, cardiovascular diseases (fig. 6) and neuropsychiatry. Later, the section for venereal diseases was assigned to the medical service. These sections were commonly housed in separate wards and headed by medical officers, who were designated chiefs, serving under the direction of the chief of the medical service. In addition, separate sections had to be maintained for officers and for enlisted men, in accordance with Army customs, and for women. Experience indicated the desirability of a section for dermatology, although one was not provided for in the organizational chart in TM 8-260. The Medical Consultants Division, OTSG, attempted to provide for the selection and assignment of personnel qualified to function in hospital staffs so organized.

As a rule, neuropsychiatry was organized as a section of the medical service in Army hospitals in the early part of the war (fig. 7). As the Army grew and neuropsychiatric conditions increasingly contributed to the noneffective rate, the Neuropsychiatry Consultants Division, OTSG, felt that the establishment of separate neuropsychiatric services in Army hospitals, indistinguishable in status with medical and surgical services, should be considered. This separation was effected in some of the large general hospitals in the Zone of Interior, and these hospitals became specially designated for the care of neuropsychiatric patients. However, for the most part, neuropsychiatry sections remained a



FIGURE 6.—Cardiac clinic, Lawson General Hospital, Atlanta, Ga., July 1942.



FIGURE 7. Patient on neuropsychiatry ward, Percy Jones General Hospital, Battle Creek, Mich.

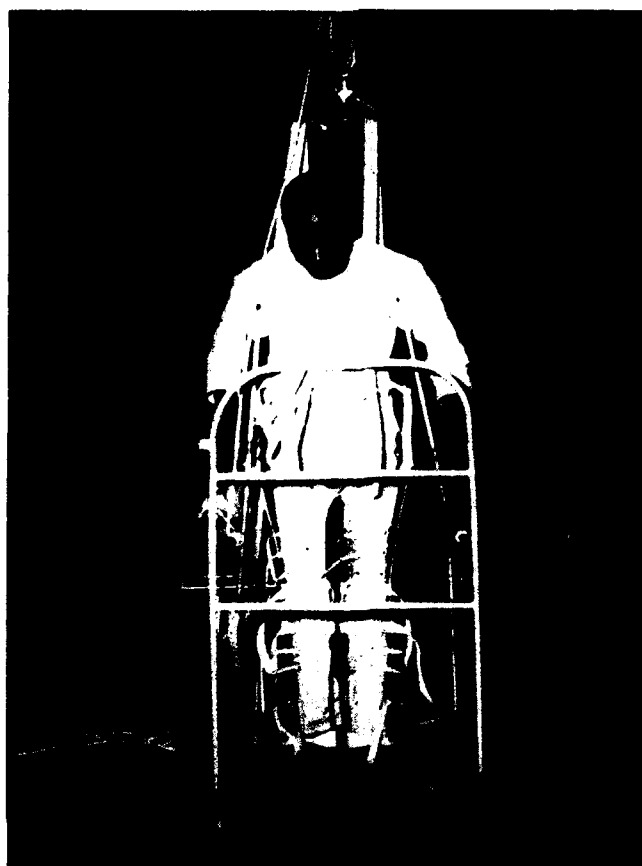


FIGURE 8.—Scene on ward at neurology center, Ashburn General Hospital, McKinney, Tex.

part of the medical service in Army hospitals. The Medical and the Neuropsychiatry Consultant Divisions, OTSG, and the consultants in the field were in complete agreement that the care of patients with somatic and psychic disturbances was the common responsibility of internist and psychiatrist and that the closest cooperation was indicated. Neurologic diseases were officially designated the responsibility of the neuropsychiatrists, and, in a few hospitals designated as neurology centers, separate and independent services were established (fig. 8). In general, however, cooperation between the internist and the neurologist was considered so essential to proper treatment as to discourage organizational trends to separate them.

Management of Diseases

The treatment of diseases in Army hospitals was under continuous scrutiny by the Medical Consultants Division, OTSG. Publications based on the best available knowledge concerning the management of various diseases were prepared in the division for publication and prompt distribution. Their effect upon practice was immediate and Army wide. Only two examples will be cited.

The time-honored and often complicated schedules of therapy for malaria were replaced with more simple regimes, after careful evaluation of the results of controlled experiments.⁸ In the management of gonorrhea, evidence of the existence of sulfonamide-resistant gonococci led, in July 1942, to the employment of artificially induced fever combined with sulfonamides.⁹ This treatment, however, though satisfactory in many instances, was accompanied by appreciable danger and was abandoned in February 1944 in favor of penicillin,¹⁰ which had been shown to be highly effective. These radical changes in the treatment of two important diseases were brought about promptly throughout the entire hospital system of the Army. Policy governing these and many other therapeutic procedures was formulated in the Medical Consultants Division. The medical consultants throughout the Army supervised implementation of the policy.

Diphtheria.--In the Pacific, it was observed that a disturbance involving the peripheral nerves frequently occurred in the presence of certain persistent ulcerations of the skin. Diphtheria bacilli were suspected, and careful bacteriological studies proved them to be inhabitants of these ulcerations. These and similar observations from the India-Burma theater shed new light upon the diagnostic criteria, clinical course, and therapeutic management of cutaneous diphtheria. The Medical Consultants Division, OTSG, prepared a comprehensive discussion of this subject for distribution to officers throughout the Medical Corps.¹¹

Hepatitis.--Clinical and laboratory studies, carried out in the Army and among civilians, made it possible, in November 1945, to publish TB MED 206, Infectious Hepatitis, which contained an evaluation of the clinical criteria and laboratory procedures used in the diagnosis and management of this disease.

Tropical diseases.--Descriptions of the clinical features, laboratory findings, and therapeutic management of many clinical disorders encountered in the Army, particularly in the field of tropical disease, resulted from observations which were correlated under the guidance of the Medical Consultants Division.

Venereal diseases.--General Morgan's opinion regarding the management of venereal diseases in the Army led to an important and difficult policy decision on the part of The Surgeon General. In the peacetime Army, as in civilian practice, the care of venereal diseases, especially gonorrhea, was assigned to the urologist. In gonorrhea, the conventional procedures were urethral

⁸ Circular Letter No. 153, OTSG, U.S. Army, 19 Aug. 1943, subject: The Drug Treatment of Malaria, Suppressive and Clinical.

⁹ (1) Circular Letter No. 74, OTSG, U.S. Army, 25 July 1942, subject: Diagnosis and Treatment of the Venereal Diseases. (2) Circular Letter No. 86, OTSG, U.S. Army, 18 Aug. 1942, subject: Fever Therapy in the Treatment of Gonorrhea. (3) Circular Letter No. 97, OTSG, U.S. Army, 12 May 1943, subject: The Use of Combined Fever and Chemotherapy in Sulfonamide Resistant Gonorrhea; and General Consideration on the Therapeutic Use of Physically Induced Fever.

¹⁰ (1) TB MED 9, 12 Feb. 1944, subject: Penicillin. (2) TB MED 16, 6 Mar. 1944, subject: Penicillin Treatment of Resistant Gonorrhea.

¹¹ TB MED 143, February 1945, subject: Cutaneous Diphtheria.

irrigations, the frequent use of prostatic massage, urethral sounds, and bladder irrigations. Genitourinary wards equipped with batteries of specially designed irrigation commodes were provided as standard equipment for hospitals. All of this was outmoded when it was found that sulfonamides by mouth promptly cured gonorrhea in the vast majority of cases and that local irrigations and manipulations caused the complications which plagued therapists and enormously increased the noneffective rate in the Army by increasing the duration of the disease. These revolutionary developments made it quite clear that gonorrhea, as well as the other venereal infections, should become the responsibility of physicians rather than of surgeons. Recommendations to this end by the chief consultant in medicine were received without enthusiasm in many quarters. It appeared to be especially difficult for Regular Army officers, whose experience with gonorrhea and its complications had been long and dismal, to accept the new doctrine. It was promptly accepted by the Surgical Consultants Division. The official announcement of policy by The Surgeon General came only after the loss of much time.¹² The remarkable effectiveness of the sulfonamides in treatment of acute gonorrhea and the disappearance of complications when local treatments were abandoned soon became apparent to all. Here, indeed, was an extraordinary episode in the history of military medicine. No other development during the war contributed so significantly toward lowering the noneffective rate.

Drugs

The selection and distribution of new drugs and of new preparations of old drugs for use by the Medical Department was an important function of the Medical Consultants Division. The drug list in the Medical Department Supply Catalog, U.S. Army, was reviewed frequently. The division actively participated in planning and observing clinical trials of many drugs, notably penicillin, the production and clinical use of which were in the experimental stage.¹³ In the selection of a therapeutic agent for use in Medical Department installations, the fullest consideration was given not only to its efficacy but also to the dangers involved in its use. Treatment with proprietary preparations which were not on the Medical Department Supply List was discouraged. The Surgeon General, upon recommendation of the Medical Consultants Division, established policy prohibiting the use of drugs not included in the Army Service Forces Medical Supply Catalog, the United States Pharmacopoeia, or the National Formulary, or accepted by the Council on Pharmacy and Chemistry of the American Medical Association or the Council on Dental Therapeutics of the American Dental Association, unless prior approval of The Surgeon General or the appropriate theater surgeon was obtained.¹⁴

¹² (1) Circular Letter No. 195, OTSG, U.S. Army, 1 Dec. 1945, subject: Treatment of Venereal Disease in Army Hospitals. (2) TM 8-262, 1 July 1945, ch. 1, sec. 21, Medical Service.

¹³ (1) See footnote 10, p. 24. (2) TB MED's 106, 11 Oct. 1944; 196, 20 Aug. 1945; 198, 20 Aug. 1945; and 172, June 1945.

¹⁴ (1) War Department Circular No. 321, August 1944, sec. II, Use of Medicinal Agents. (2) War Department Circular No. 264, 1 Sept. 1945, sec. VII, Use of Medicinal Agents.

Chest Examinations

Roentgenographic examination of the chest of every inductee was essential during mobilization, for the protection both of the individual and the military service. Examinations with the conventional 14- by 17-inch X-ray film were cumbersome, time consuming, and expensive. Civilian equipment and personnel were frequently employed, sometimes at great expense. The Medical Consultants Division, through Colonel Long, Chief, Tuberculosis Branch, was instrumental in establishing photoroentgen units using 4- by 5-inch film in all induction stations. It thus became possible to make routine chest X-ray examinations without burdening local civilian X-ray facilities and with great financial saving to the Government.

Clinical Laboratories

The Medical Consultants Division, OTSG, had only an indirect part in the establishment and organization of clinical laboratories in Army hospitals. The Preventive Medicine Service, OTSG, was charged with this responsibility. Although in the Surgeon General's Office the relationship with the Laboratories Division of the Preventive Medicine Service was always one of cooperation, difficulties resulted here and in the field because of administrative separation. The experience of World War II leads to the conclusion that a more direct participation in the planning and supervision of laboratory work by the Medical Consultants Division and by the *clinicians assigned to the medical service of hospitals* would be helpful to the actual operation of clinical laboratories in the field. The evaluation of routine and special laboratory procedures in Army hospitals or in special laboratories in support of Army hospitals is believed to be, to a large extent, although not exclusively, the function of the clinician for whose assistance the laboratory, in large part, exists. In the service commands and in oversea theaters, consultants in medicine interested themselves directly in the maintenance of high standards in the clinical laboratories (fig. 9). This was beneficial both to the laboratory and to the medical service.

The appropriate use of laboratory procedures by medical officers was the subject of special interest both to the Medical Consultants Division and to the medical consultants in the field.¹⁵

Convalescence and Reconditioning

The Medical Consultants Division, OTSG, took an early and continuing interest in measures designed to shorten the hospital stay for the sick and at the same time to return the soldier to duty in the best possible condition. The great number of patients who were hospitalized with minor illnesses and the length of time they spent in hospitals contributed heavily to the non-

¹⁵ Circular Letter No. 193, OTSG, U.S. Army, 30 Nov. 1943, subject: Elimination of Unnecessary Laboratory Work.

effective rate. Soldiers had to remain in hospitals until they were fit for full duty. In 1942, there was no organized effort in hospitals to utilize time available in the convalescence phase of illness to improve the soldiers' physical status and morale prior to his return to duty. The Medicine Division took the initiative in this matter. Through visits to the field and informal correspondence, an effort was made to develop a program to shorten the time spent in convalescence and to make better use of this time (fig. 10). As a result, War Department Memorandum W40-6-43 of 11 February 1943, entitled "Convalescence and Reconditioning in Hospitals," was published; this memorandum marked the official initiation of a definite program for the rapid and complete rehabilitation of the disabled soldier. Although the program was far from satisfactory, it terminated the attitude of indifference toward the matter. The service command consultants in medicine encouraged and, in many instances, helped initiate reconditioning programs in hospitals under their professional supervision. In late 1942, General Morgan and Brig. Gen. (later Maj. Gen.) David N. W. Grant, the Air Surgeon, conferred informally with Maj. (later Col.) Howard A. Rusk, MC, Chief of the Medical Service, Army Air Force Station Hospital, Jefferson Barracks, Mo., on the subject of convalescence and rehabilitation. Major Rusk promptly organized a reconditioning program at the Jefferson Barracks Station Hospital and put it into operation. This marked the beginning of the extraordinarily effective program developed by Major Rusk for all Air Force medical units. Subsequently, greatly stimulated by this successful program in Air Force hospitals, The Surgeon General established a reconditioning division to administer such programs.

ADMINISTRATIVE AND CLINICAL ADVANCES DURING WORLD WAR II

At the close of the war in 1945, the Director, Historical Division, OTSG, U.S. Army, requested the Medical Consultants Division to provide in outline a statement of general advances in medical treatment during World War II. The following comments are taken from the reply to this request. They are presented without editing and represent attitude and opinion as of 24 September 1945.

1. *Effective utilization and supervision of specially qualified medical personnel.*—Largely through the services of a small group of expert consultants in The Surgeon General's Office, Service Command Headquarters, and Theater Headquarters, the varied specialized skills of medical officers have been effectively used and supervised both in the United States and overseas. A system of hospitals has been created with selected staff and equipment for the treatment of special military medical problems. In general, professional care has been standardized at a high level. The results are reflected in shortened periods of hospitalization and reduced fatality rates. Days lost because of disease averaged 13 for 1942-44, against 18 days for 1917-19. Deaths from disease were 0.6 per 1,000 cases in 1942-44, against 15.6 per 1,000 cases in 1917-19.



FIGURE 9.— Clinical laboratories overseas. — A. Advance detachment, 1st Medical General Laboratory, Paris, France, October 1944. — B. 39th General Hospital, Saigon, 1945.



FIGURE 9. —Continued. C. 237th Station Hospital, Finschhafen, New Guinea, December 1944. D. 15th Medical Laboratory, Italy, 1945.



FIGURE 10. Convalescence and reconditioning in hospitals. A. Bed patients in an orthopedic ward performing arm exercises using improvised pulley-and-weight apparatus on Balkan frames, Ashburn General Hospital, McKinney, Tex. B. Convalescent patients receiving military instruction in the carbine, 129th Station Hospital, Hawaii, 1944.

2. *Effective development of sulfonamides and penicillin as chemotherapeutic agents.*—The application of penicillin was developed in a small fraction of the time that would have been required in peacetime. The success of the use of sulfonamides and penicillin is reflected in periods of hospitalization and low fatality rates for many infections, specific examples of which are given below:

a. *Meningococcus infections, including meningitis and septicemia.*—Sulfadiazine was proved to be an extremely effective treatment, far superior to any previous method, even in extremely severe cases which occurred in large numbers at various times during the war. Later, penicillin was shown to be almost equally effective. The case fatality rate in World War II was approximately 4 per cent (to be compared with 38 per cent in World War I).

b. *Bacillary dysentery.*—Sulfaguanidine, the drug of choice at the start of the war, was replaced by sulfadiazine which was found to be the most effective treatment available. Although a great many cases occurred, the case fatality rate in World War II was about 0.05 per cent, whereas in World War I it was 1.6 per cent.

c. *Pneumonia.*—The types of pneumonia which occurred in the two World Wars differed to a considerable extent. Nevertheless, it is noteworthy that the case fatality rate in World War II was 0.7 per cent, as against 28 per cent in World War I.

d. *Acute upper respiratory infection.*—It was shown that in the presence of an epidemic of this disease the daily administration of small doses of sulfadiazine decreases materially the incidence of complications which are commonly associated with colds and which are usually due to streptococcus invasions. As a corollary, it was found that certain types of streptococci become resistant to sulfadiazine.

e. *Venereal diseases.*—The use of penicillin has revolutionized the treatment of gonorrhea and syphilis. Days lost by soldier patients because of gonorrhea in 1944 averaged 7, whereas the average in 1939 was 42.

f. *Skin diseases due to bacterial agents.*—Medical Department studies have shown that various methods of using penicillin greatly improved the treatment of many of these infections, especially impetigo, furunculosis, and ecthymatous ulceration.

3. *Streptomycin.*—This recently discovered drug is still under study. It has already been shown, however, to be effective in certain diseases that are resistant to treatment with other agents, notably certain otherwise intractable infections of the urinary bladder.

4. *Effective treatment of malarial attacks.*—Largely through the application of improved methods of using Atabrine (quinacrine hydrochloride) and by the prompt institution of treatment, malarial attacks have not caused chronic physical disability and deaths from malaria in 1943 and 1944 amounted to only 180, although there were recorded about 320,000 attacks (0.06 deaths per 100 admissions). In 1917–19 there were 36 deaths due to malaria among 15,600 admissions for malaria (0.02 deaths per 100 admissions).

5. *Higher fatty acids in the treatment of certain superficial fungus infections.*—It has been shown that preparations of undecylenic acid and propionic acid are both effective drugs in the treatment of troublesome superficial fungus infections, including "athlete's foot." In addition, these agents cause many fewer sensitivity reactions than drugs formerly in use.

6. *Podophyllum.*—Just before World War II began civilian physicians found that podophyllum was effective in the treatment of verrucae of the genitalia. During the war medical officers confirmed this finding, obtaining spectacular results in the treatment of this condition.

7. *Advances in knowledge of the course and general management of important diseases.*—In a number of instances important advances were made in the knowledge of the course of serious but poorly known diseases and at the same time the general management of patients with these diseases was greatly improved, although in these instances effective specific chemotherapeutic agents are not now available. The following instances deserve special mention.

a. *Infectious hepatitis.*—Important advances were made in the diagnosis and prognosis. Much new information was obtained concerning the significance of numerous

tests of liver function. Early and prolonged rest in bed and dietary management, especially the use of high protein feedings, were shown to be the more important available methods of treatment.

b. *Filariasis*.—Experience to date has shown that infection of soldiers when limited in duration by prompt evacuation to nonendemic areas is rarely, if ever, followed by permanent disability or significant lasting bodily changes. Psychological management and reconditioning are important aspects of treatment.

c. *Schistosomiasis*.—Late in the war, a number of soldiers contracted this little known disease in the Philippines. Much has been learned about the course of the infection. The drug treatment is still a matter of research.

d. *Coccidioidomycosis*.—As a result of the infection with this disease of many soldiers in the western part of the United States, a great deal has been learned about its course and management.

e. *Skin diseases associated with the tropics*.—Soldiers in various parts of the tropics have acquired cutaneous diphtheria, cutaneous leishmaniasis, atypical lichen planus, and generalized hyperhidrosis. Such conditions were previously little understood, especially in the United States.

8. *Convalescence*.—The importance of systematic management of convalescence was stressed early in the war and methods of proper management were developed.

SPECIALIZATION IN ZONE OF INTERIOR HOSPITALS

In the United States, the trend toward specialization¹⁶ in medical practice was very strong, long before World War II. It was carried over into the Army by The Surgeon General with the assignment of medical and surgical specialists to supervise the care of the seriously ill and injured soldiers and to assist programs of prevention.

The framework for the assignment of individuals in the various specialties and subspecialties of internal medicine was, for the most part, already established in the organization of the medical services of Army hospitals at the outbreak of World War II. Of course, nothing of the sort was feasible or desirable in the assignment of medical officers to troops in the field, where general practice was the order of the day.

In addition to the policy of assigning specialists, whenever possible, where they could work in their respective fields, there developed, during the war, the use of hospitals especially manned and equipped to deal with certain

¹⁶ Documents which implemented the Medical Department's policy of specialization during World War II, as discussed in this section, are (1) War Department Army Regulations 40-600, 6 Oct. 1942, pars. 7b and 13; (2) War Department Memorandum W40-14-43, 28 May 1943, subject: General Hospitals Designated for Special Surgical Treatment; (3) Letter, Headquarters, Army Service Forces to Commanding Generals, All Service Commands and Commanding Generals Military District of Washington, 17 Dec. 1943, subject: General Hospitals Designated for Specialized Treatment; (4) Letter, Medicine Division, OTSG, to Surgeons, All Service Commands, 7 Aug. 1944, subject: New Overall Hospitalization Plan as It Affects the Medical Services of Hospitals; (5) Memorandum, Brig. Gen. Hugh J. Morgan for The Surgeon General, 11 Nov. 1943, subject: The Treatment of Malaria; (6) Memorandum, Medicine Division for Chief, Operations Service, 18 Mar. 1944, subject: General Hospitals Designated for Specialized Treatment; (7) Memorandum, Brig. Gen. Hugh J. Morgan for Chief, Operations Service, 29 May 1944, subject: Recommendation for the Designation of a General Hospital for Specialized Treatment of Tropical Diseases; (8) Memorandum, Maj. Clarence S. Livingood, MC, for Brig. Gen. Hugh J. Morgan, 23 June 1945, subject: Hospitalization of Dermatologic Patients; (9) Memorandum, Director, Resources Analysis Division for Medical Regulating Officer, 26 July 1945, subject: Revision in Authorized Patient Capacities; (10) War Department Circular No. 347, 25 Aug. 1944, subject: General Hospital—Designated for Specialized Treatment; and (11) Army Service Forces Circular No. 456, pt. II, 29 Dec. 1945, subject: Hospital Establishment of Specialized Center for Tuberculosis at Moore General Hospital.

diseases or groups of diseases. The concentration of large numbers of patients with similar disorders in these hospitals—designated “centers” for special treatment—favored optimum care for the sick soldier, while it assured more economical use of highly specialized medical officers and gave them an opportunity for intensive clinical experience. Carefully planned clinical studies, including the trial of approved therapeutic measures, were possible in a few selected medical installations.

The Medical Consultants Division, OTSG, recommended the designation of certain hospitals as centers for tuberculosis, arthritis, vascular diseases, neurosyphilis, tropical diseases, rheumatic fever, and dermatological diseases, and for the care of general medical problems in patients evacuated from overseas late in the war under the special designation of “medicine.” The developments leading to this designation are discussed in the following paragraph.

General medicine.—In all theaters, during 1944, there was increasing need for Medical Corps officers qualified in internal medicine. At this time, it was difficult to provide full staffs for the medical services in 59 general hospitals operating in the Zone of Interior. However, a survey indicated that provision had been made in these hospitals for a larger number of medical patients than were being sent to them either from station hospitals in the Zone of Interior or from overseas. On the other hand, beds for surgical patients were in short supply. It was proposed that the number of general hospitals receiving medical patients in the Zone of Interior be reduced. A full staff of internists would be provided each hospital designated to receive medical patients. A smaller but adequate number of qualified internists would be assigned to each of the remaining hospitals, in which the surgical services would expand as the medical service contracted. The purpose and details of this plan were explained by General Morgan in letters to each service command surgeon on 7 August 1944. The official designation of certain hospitals simply as specialty centers for medicine was announced in August 1944 (fig. 11). Objections were voiced from time to time because of the limited number of specialists in internal medicine allotted to hospitals not so designated. However, it is believed that this redistribution of patients and specialists met the overall problem by providing superior care in internal medicine in general hospitals at home, while it made available specialists to the overseas theaters where they were badly needed.

Tuberculosis.—The peacetime Army had for many years maintained a center for the care of tuberculous patients at Fitzsimons General Hospital, Denver, Colo. (fig. 12). This designation was continued throughout the war. The numerical increase in patients from the greatly enlarged Army and the prolonged period of hospitalization required for treatment made additional beds necessary. In August 1944, Bruns General Hospital, Santa Fe, N. Mex., was designated a tuberculosis center, and its medical staff was supplemented with officers specially qualified in this field. In December 1945, Moore General Hospital, Swannanoa, N. C. (fig. 13), was similarly designated and manned.



A



B

FIGURE 11. Specialty centers in general medicine. A. Headquarters, Battey General Hospital, Rome, Ga., September 1943. B. Discouragingly long corridors typical of wartime cantonment construction, Madigan General Hospital, Tacoma, Wash.



FIGURE 12. Fitzsimons General Hospital, Denver, Colo.

Arthritis. Before World War II, the Army had utilized the special physiotherapy facilities of Army and Navy General Hospital, Hot Springs, Ark., for the care of patients with rheumatic diseases. This hospital was officially designated an arthritis center in December 1943. However, in both the Zone of Interior and various theaters of operations, there were found large numbers of arthritic patients requiring specialized therapy and prolonged periods of hospitalization (fig. 14). To provide additional beds and a better opportunity to evaluate methods of treatment and disposition, a second arthritis center was established at Ashburn General Hospital, McKinney, Tex.

Vascular diseases. The initial designation of hospitals in the United States for the treatment of vascular diseases was made in December 1943, on the recommendation of the Surgical Consultants Division, OTSG. However, many patients seen at these centers required medical rather than surgical management. Therefore, internists with special interest and experience in vascular disorders were found and assigned to these hospitals early in 1944, and the official designation was changed from "vascular-surgery centers" to "vascular centers." Here, on the medical services, clinical investigation of a high order was carried out in relation to trenchfoot, immersion foot, and frostbite. Optimum methods of treatment and disposition were defined. Physicians with special knowledge of the physiology of the circulatory system cooperated closely with surgeons of similar training and interest, to the great advantage of both.

Neurosyphilis. By the spring of 1944, the number of patients with manifestations of neurosyphilis had begun to mount considerably. It was difficult to assure uniform and optimum management when patients were admitted

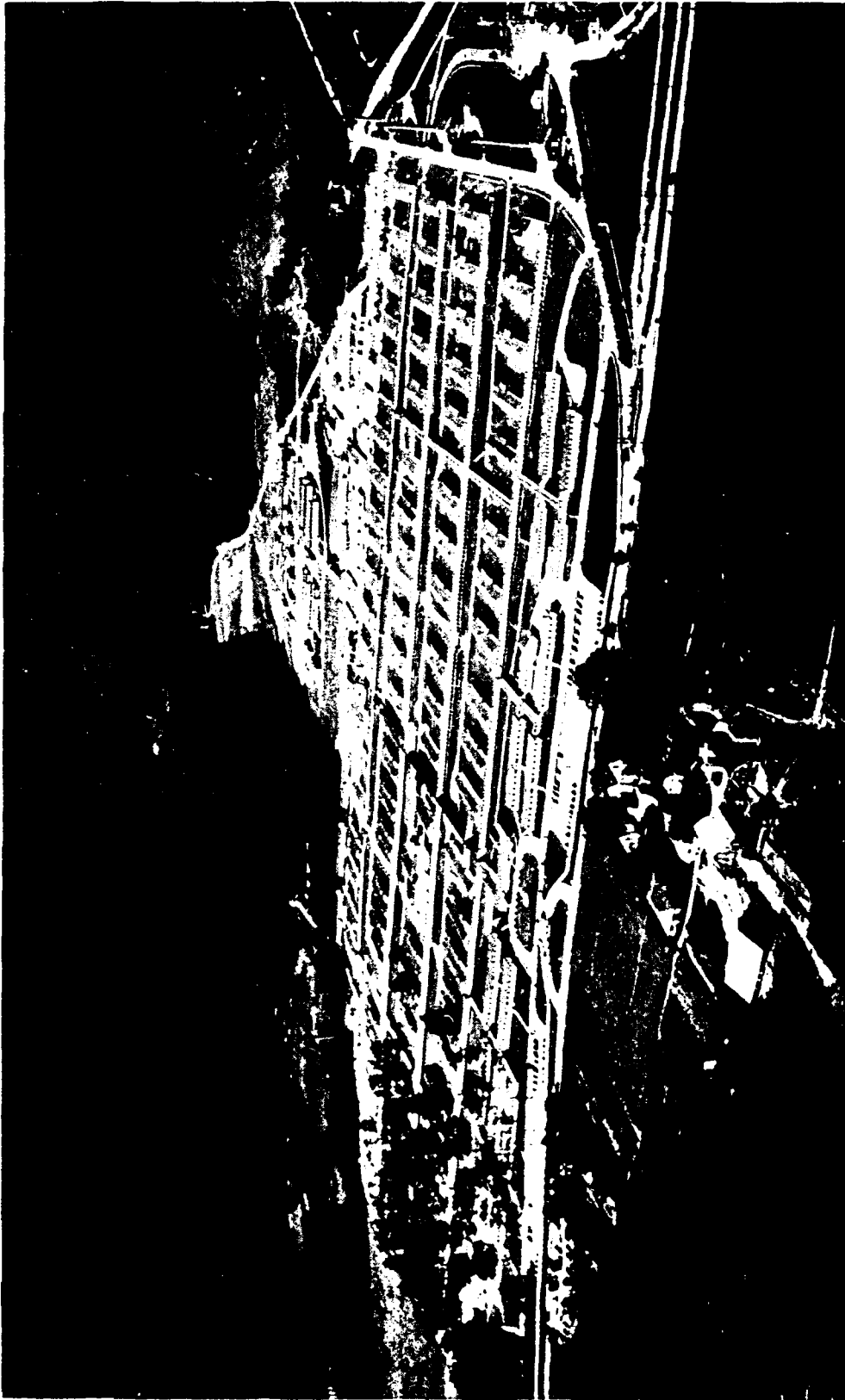


FIGURE 13. — Moore General Hospital, Swanton, N.C.

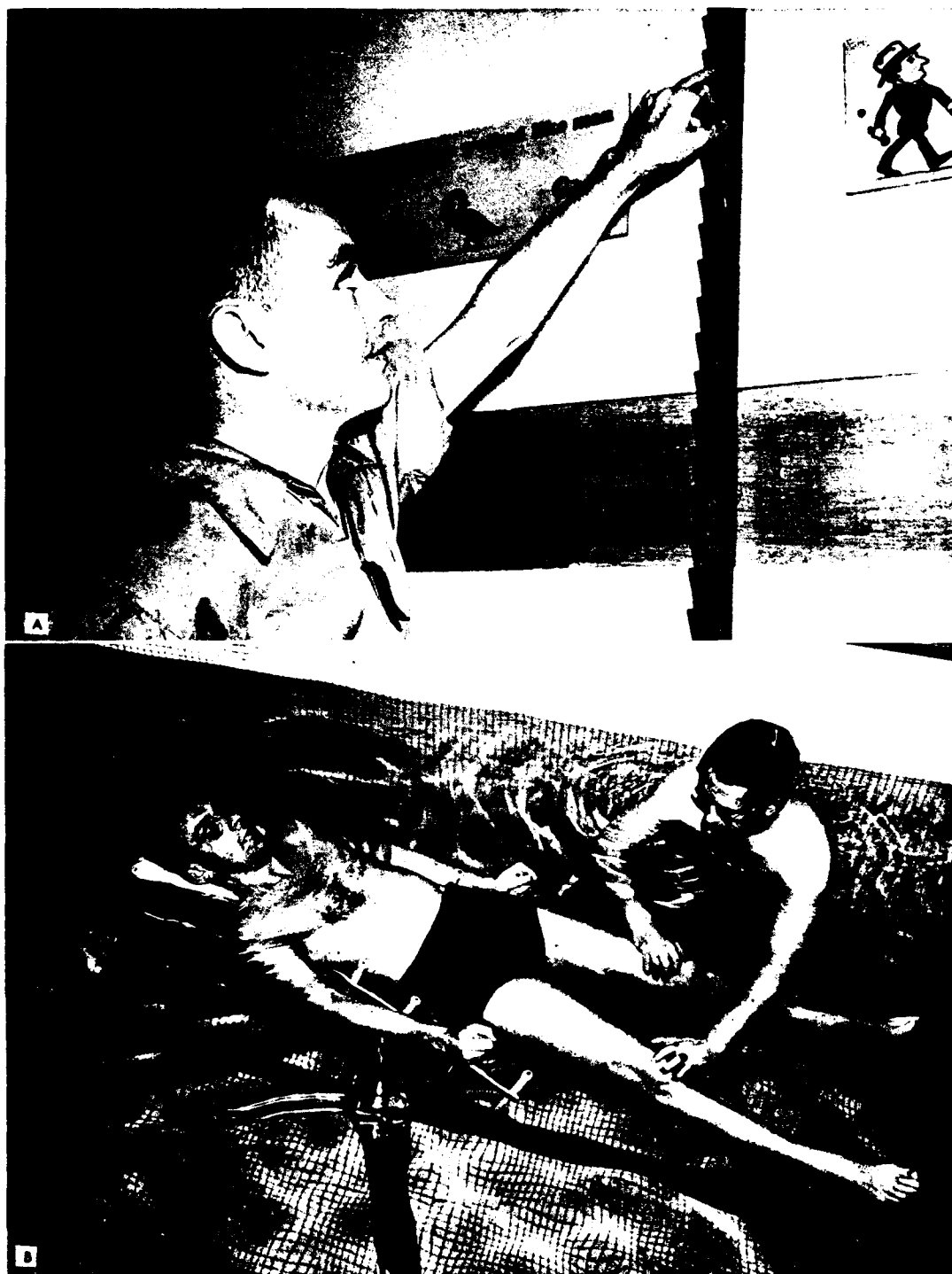


FIGURE 14.—Therapy used in treatment of arthritic patients. A. Creeper device used to develop range of motion. B. Arthritic patient in pool working upper arms while attendant gives proper exercise to lower limbs.

indiscriminately to any of the Army general hospitals. Therefore, in June 1944, seven general hospitals located conveniently throughout the Zone of Interior were specially staffed and designated for care of neurosyphilis patients.

Rheumatic fever.—Two needs—one for uniform management of patients with rheumatic fever in a favorable climate, the other for increased knowledge regarding all aspects of the disease—suggested the establishment of specially staffed centers. However, air transportation of acutely ill rheumatic fever patients created special problems. Again, plans to coordinate clinical studies with similar studies carried on in hospitals under the direct supervision of the Air Surgeon were difficult to administer. Discussions begun in the early spring of 1944 did not produce the actual designation of hospitals until August 1944, when the establishment of three rheumatic fever centers was announced. These were Foster General Hospital, Jackson, Miss., Birmingham General Hospital, Van Nuys, Calif., and Torney General Hospital, Palm Springs, Calif.

Tropical diseases.—Clinical problems in tropical diseases were difficult and numerous. In particular, reliable information regarding prognosis and optimum treatment was lacking for malaria, filariasis, and schistosomiasis. The Medical Consultants Division, OTSG, recommended early in 1943 the establishment of centers, both in the United States and overseas, for the observation, study, and special treatment of patients with tropical diseases. Since at that time malaria was the only tropical disease occurring with troublesome frequency and since higher authority in the Surgeon General's Office was unsympathetic to the project, no action was taken. On 11 November 1943, the establishment of a number of malaria treatment study units, both in the United States and overseas, was again recommended. The Surgeon General responded to this request by establishing, on 15 November 1943, the Board for Study of the Clinical Treatment of Malaria (p. 50). This board used four general hospitals in the United States and studied the relative value of eight different plans of treatment. One definite conclusion arrived at was that Plasmochin naphthoate (pamaquine naphthoate) did not cure malaria caused by infections from *Plasmodium vivax*.

Believing that special study and special treatment facilities for tropical diseases were, in fact, mandatory, the Medical Consultants Division again recommended, on 29 May 1944, that at least one center be established and in this connection cited a simple administrative problem. At about that time, it had become necessary to make provision in one hospital for a large number of filariasis patients returning from overseas. The administrative requirement carried weight, and, on 25 August 1944, Moore General Hospital was finally designated a tropical disease center. Highly qualified clinical and laboratory staffs were assembled. Eventually, studies of filariasis, malaria, tropical skin diseases, schistosomiasis, and leishmaniasis were carried out under the direction of Maj. Harry Most, MC, chief of the tropical disease section; Lt. Col. (later Col.) Joseph M. Hayman, Jr., MC, chief of the medical service, and Lt. Col. (later Col.) Frank W. Wilson, MC, commanding officer.

Harmon General Hospital, Longview, Tex., had been selected by The Surgeon General's board on malaria in 1943 to try 1 of its 8 plans for treatment. After The Surgeon General's board filed its final report on the treatment of malaria on 26 March 1944, 4 months and 11 days after its organization, the malaria studies were taken over, continued, and expanded by the staff in medicine at Harmon General Hospital. Finally, in April 1945, Harmon also was designated a tropical disease center. The contributions of this hospital extended over a period of 2½ years and were of great value in connection with malaria, filariasis, schistosomiasis, and tropical skin disorders. Those chiefly responsible for this work were Maj. (later Lt. Col.) Harry H. Gordon, MC, chief of the tropical disease section; Colonel Marble and Lt. Col. (later Col.) Worth B. Daniels, MC, successively chiefs of the medical service; and Col. Gouverneur V. Emerson, MC, commanding officer.

Dermatologic conditions.—In the spring of 1945, after a careful survey of the problem in general hospitals in this country, Major Livingood of the Medical Consultants Division recommended that the management of patients with dermatological conditions be concentrated in seven general hospitals, where the small number of specialists then available could more adequately care for them. In a memorandum of 23 June 1945, this plan was described by Major Livingood, and it was officially adopted on 26 July 1945.

The results which accrued from the use of hospitals designated as special centers for the care of certain diseases or groups of diseases were impressive. The centers provided good patient care, efficient use of limited personnel with specialty qualifications, opportunities for clinical investigation, specialized programs for convalescent care and rehabilitation, and opportunities to plan the ultimate disposition of certain large groups of patients. It is clear in retrospect that the establishment of these centers earlier in the emergency would have been wise administration.

EXCHANGE OF PROFESSIONAL INFORMATION

A major interest of the Medical Consultants Division, OTSG, was the collection and dissemination of professional information throughout the Medical Department, particularly information concerned with recent advances in medical knowledge and techniques and with the development of new approaches based upon observations and study in the field. The Medical Consultants Division, in the highest echelon of the Medical Department, was strategically situated to encourage and direct this activity.

Early in the development of the Medical Consultants Division, a great deal of time was devoted to the study and manipulation of channels of communication through which important medical information could flow from field to headquarters. With the establishment of consultants in the service commands and oversea theaters, the interchange of professional news and opinion became a compelling necessity. The difficulties resulting from rigid adherence to command channels during the early days of the war were of such magnitude

and importance that they should be mentioned. Those difficulties were not confined solely to prohibitions issued by officers of the line against the transmission of medical intelligence. Certain service command and theater surgeons, either of their own volition or because of orders from higher authority, forbade the forwarding of technical information by the service command or theater medical consultant to the chief consultant in the Surgeon General's Office. The conclusion is inescapable that much of the difficulty regarding interchange of technical information which characterized the early period of the war could have been avoided had line and medical officers alike adopted a sane commonsense attitude toward the interpretation of directives dealing with command channels and military security.

Reports, correspondence, and meetings.—The ETMD (Essential Technical Medical Data) reports initiated by the Medical Department in 1943 helped greatly to facilitate the interchange of professional news and opinion. These reports, gathered in the major oversea headquarters, contained data concerning the incidence and management of disease in the various subordinate units; the satisfactoriness of treatment agents, equipment, and supplies; and the availability of qualified professional personnel. Though far from adequate for the needs of the Medical Consultants Division, these ETMD reports furnished one medium at least through which professional information could be exchanged between personnel in oversea theaters and the Zone of Interior.

Service command medical consultants in the Zone of Interior usually forwarded to the Medical Consultants Division carefully prepared reports of visits which they made to each medical installation within their command. These formal reports were frequently supplemented by personal correspondence. The service command consultants were encouraged to communicate freely when they felt that the Division could give assistance or that the Surgeon General's Office or the medical installations in other commands should be informed concerning professional matters. These personal letters permitted rapid transmission of news and ideas and free expressions of opinion.

Annual meetings of medical consultants in the Zone of Interior were held, with programs divided between clinical and administrative topics (appendix B p. 831). In 1943, the meeting was held in the Surgeon General's Office (fig. 15); in 1944, at Ashford General Hospital, White Sulphur Springs, W. Va. (fig. 16); and in 1945, at Thomas M. England General Hospital, Atlantic City, N.J. At the first of these meetings, in 1943, the neuropsychiatrists were in attendance. Subsequently, in 1944 and 1945, attendance was confined to the medical consultants from the service commands and the civilian consultants in medicine to The Surgeon General. The Surgeon General or his deputy and the chiefs of personnel and hospitalization services also attended. At the meetings in 1944 and 1945, it was possible to have representatives, temporarily in this country, from some of the oversea theaters.

In addition to encouraging exchange of information on professional matters throughout the Army, the Medical Consultants Division, OTSG, maintained liaison with other individuals active in the field of clinical investi-



FIGURE 15. Meeting of consultants in medicine, OTSG, 25-26 October 1943.

Left to right, first row, seated: Col. W. Bauer, Third U. S. Service Command; Col. A. Eason, Director, Medical Division; Brig. Gen. C. C. Halpern, Chief, Professional Services; Brig. Gen. H. J. Morgan, Chief Consultant in Medicine to The Surgeon General; and Lt. Col. A. R. Mason, Ninth Service Command.

Second row, standing: Lt. Col. F. R. Long, Chief, Medicine Branch; Lt. Col. F. D. Allen, Fourth Service Command; Lt. Col. H. L. Blumenthal, Second Service Command; Col. W. B. Allen, First Service Command; and Lt. Col. F. R. Donahue, Medicine Branch.

Third row: Lt. Col. R. H. Tresser, Lt. Col. E. A. Allen, Seventh Service Command; Lt. Col. L. S. Wright, Lt. Col. G. P. Derry, Lt. Col. H. J. Stahl, Medicine Branch; and Capt. W. H. Storer, Medicine Branch.

gation. Members of the staff regularly attended important civilian medical meetings and meetings of appropriate committees of the National Research Council.

Publications. In the fall of 1942, representatives of the Surgical and Medical Consultants Division suggested to others in the Surgeon General's Office that a medical newsletter be established. Such a medium was made available in January 1943. Only two issues were published before the project had to be abandoned because of administrative difficulties. Further discussions within the Surgeon General's Office resulted in converting the quarterly *Army Medical Bulletin* to a monthly publication called the *Bulletin of*



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the U.S. Army Medical Department. In this bulletin, there appeared regularly through the remainder of the war both articles and news items relating to current problems in the field of medicine. The establishment of the bulletin was announced in Circular Letter No. 165, OTSG, U.S. Army, 15 September 1943, and the first issue appeared the following month. The chief consultants in surgery and medicine became members of the editorial staff. Unfortunately, distribution of this bulletin, even in the Zone of Interior, constituted a major problem. Copies were never received by many medical officers in oversea installations, although direct mailing to officers at their APO's improved distribution to some extent.

Another medium for dissemination of official communications concerning diagnosis, treatment, and disposition of patients in Army hospitals was the circular letters of the Surgeon General's Office. These were discontinued on 31 December 1943. They were replaced by TB MED's and to a less extent, by War Department circulars, Army regulations, FM's (War Department Field Manuals) and TM's.

FIGURE 16.—Conference of military and civilian consultants in medicine, Ashford General Hospital, White Sulphur Springs, W. Va., 30-31 October 1944.

Left to right, first row, seated: Col. D. M. Pillsbury (Consultant, Dermatology, ETOUSA), Col. F. P. Strome (Surgeon, Third Service Command), Col. E. A. Noyes (Surgeon, Fifth Service Command), Brig. Gen. H. J. Morgan (Chief Consultant in Medicine to The Surgeon General), Col. C. M. Beck (Commanding Officer, Ashford General Hospital), Col. A. Freer (Chief, Professional Administrative Service, OTSG), and Col. W. P. Holbrook (Chief, Professional Division, Army Air Forces).

Second row: Lt. Col. T. H. Sternberg (Director, Venereal Disease Control Division, OTSG), Col. E. V. Allen (Consultant, Seventh Service Command), Col. T. Fitz-Hugh, Jr. (Consultant, Third Service Command), Col. W. Bauer (Consultant, Eighth Service Command), Dr. J. H. Stokes (Consultant, Dermatology), Dr. W. L. Palmer (Consultant, Gastroenterology), Dr. J. E. Moore (Consultant, Venereal Diseases), Col. I. S. Wright (Consultant, Sixth Service Command), Dr. M. F. Boyd (Consultant, Tropical Diseases), Dr. R. B. Watson (Consultant, Tropical Diseases), Lt. Col. H. J. Shull (Chief, General Medicine Branch, OTSG), and Dr. P. D. White (Consultant, Cardiovascular Diseases).

Third row: Col. V. R. Mason (Consultant, Ninth Service Command), Col. F. D. Adams (Consultant, Fourth Service Command), Dr. R. L. Levy (Consultant, Cardiovascular Diseases), Dr. C. B. Thomas (Consultant, Infectious Diseases), and Dr. R. A. Cooke (Consultant, Allergy).

Fourth row: Lt. Col. F. R. Dieuaide (Chief, Tropical Disease Treatment Branch, OTSG), Dr. C. M. Jones (Consultant, Gastroenterology), Lt. Col. H. L. Blumgart (Consultant, Second Service Command), and Dr. C. M. MacLeod (Consultant, Infectious Diseases).

Fifth row: Dr. W. B. Wood, Jr. (Consultant, Infectious Diseases), Lt. Col. M. J. Farrell (Deputy Director, Neuropsychiatry Consultants Division, OTSG), and Maj. A. C. Van Ravenswaay (Chief, Medicine Branch, Army Air Forces).

Sixth row: Col. B. M. Baker (Consultant, South Pacific Base Command), Lt. Col. J. McGuire (Consultant, Fifth Service Command), and Dr. H. W. Brown (Consultant, Tropical Diseases).

Seventh row: Dr. F. M. Rackemann (Consultant, Allergy), and Lt. Col. G. P. Denny (Consultant, First Service Command).

Circular letters of the Surgeon General's Office and TB MED's were the usual vehicles for conveying useful clinical information and outlining professional procedures. Each of these publications, when written by the Medical Consultants Division, was the editorial responsibility of one member of the staff. Its contents expressed, in general, a summation of the best available information on the subject under discussion. Throughout the emergency, the Division's staff devoted much time and effort to the preparation of these publications. The circular letters, TB MED's and other publications which were prepared wholly or in considerable part by the Division are listed in table 1.

TABLE 1.—*Publications prepared wholly or in part by the Medical Consultants Division*¹

Publication	Subject	Date
Office of the Surgeon General circular letters:		
55.....	Notes on the Treatment of Jaundice.....	May 1942.
74.....	Diagnosis and Treatment of Venereal Diseases.	July 1942.
86.....	Fever Therapy in the Treatment of Gonorrhea.	August 1942.
105.....	The Treatment of Syphilis by Unit Medical Officers.	August 1942.
135.....	The Treatment and Clinical Prophylaxis of Malaria.	August 1942.
158.....	Medical Books.....	November 1942.
27.....	Staff Rounds and Meetings in Hospitals of the Medical Department of the United States Army.	January 1943.
33.....	Treatment and Control of Certain Tropical Diseases.	February 1943.
126.....	Medical Books and Journals Including Authorization for Limited Procurement.	July 1943.
136.....	Treatment of Heat Stroke, Heat Exhaustion, and Heat Cramps.	July 1943.
153.....	The Drugs Treatment of Malaria, Suppressive and Clinical.	August 1943.
175.....	Management of Poliomyelitis.....	October 1943.
197.....	Management of Convalescence from Malaria.	December 1943.
TB MED's:		
9.....	Penicillin.....	January 1944.
9, change 1.....	Penicillin.....	September 1945.
72.....	Treatment of Clinical Malaria and Malaria Parasitemia.	July 1944.
136.....	Avoidance of Relapses of Vivax Malaria by Use of Suppressive Medication.	January 1945.
138.....	Cholera.....	January 1945.

See footnote at end of table.

TABLE 1.— *Publications prepared wholly or in part by the Medical Consultants Division*¹—Con.

Publication	Subject	Date
TB MED's—Continued		
142.....	Filariasis (Wuchereria) with special reference to early stages.	February 1945.
143.....	Cutaneous Diphtheria.....	February 1945.
149.....	Descriptive List of Drugs and Chemicals in Far East CAD Units.	March 1945.
159.....	Amebiasis.....	May 1945.
167.....	Schistosomiasis Japonica.....	June 1945.
168.....	Diabetes Mellitus.....	June 1945.
172.....	Treatment of Infectious Diseases with Sulfonamide Drugs.	June 1945.
175.....	Prevention and Treatment of Adverse Effects of Heat.	June 1945.
183.....	Visceral Leishmaniasis-Kala-Azar.....	July 1945.
193.....	Poliomyelitis.....	August 1945.
202.....	Allergy.....	October 1945.
205.....	Leprosy.....	November 1945.
206.....	Hepatitis.....	November 1945.
210.....	Professional Rounds and Meetings in Hospitals.	December 1945.
War Department circulars:		
189.....	Section III. Malaria (Information concerning effect of attacks on health.)	January 1945.
321.....	Section II. Use of Medicinal Agents.....	August 1944.
264.....	Section VII. Use of Medicinal Agents.....	September 1945.
War Department Supply Bulletins:		
8-3.....	Medical Department Professional Books.....	March 1944.
8-4.....	Medical Department Professional Journals.....	March 1944.
8-20.....	Medical Department Professional Books.....	May 1945.
FM 21-11.....	First Aid for Soldiers.....	April 1943.
TM 8-500.....	Hospital Diets.....	March 1945.

¹ In addition to these numbered publications, the Medical Consultants Division assisted in the preparation of the "Booklet of Instructions for the Use of Drugs Contained in the 100-Man Unit of the Medical List for Allied Prisoners of War in the Far East," published by the American Red Cross.

It should be repeated that the distribution of professional publications was neither so prompt nor so complete as it should have been, especially in oversea theaters. Journals and books received at oversea depots had low priority ratings for distribution, and delivery to hospitals was often delayed or failed completely. Individual medical officers in forward units who might have profited most from the medical technical bulletins frequently did not receive them at all or received them only after great delay. Often, careless handling at medical installations delayed or defeated proper distribution.

Educational media.—General Morgan believed that the assignments of most physicians in the Medical Department provided them an opportunity

for professional improvement. He also believed that the Medical Department was obligated to render all practical assistance possible to medical officers in their efforts to improve their professional knowledge. Consequently, procedures of educational value were encouraged in Medical Department installations. Medical consultants in the major commands, both in the Zone of Interior and overseas, were the pivotal personnel in this undertaking. Circular Letter No. 27, OTSG, United States Army, 22 January 1943, and TB MED 210, December 1945, stressed importance of staff rounds and staff meetings in hospitals. The Medical Consultants Division was successful in its efforts to modernize and enlarge hospital libraries in respect to internal medicine. The Board for Review of Books and Periodicals, OTSG, theoretically made selections of professional texts and journals available to each medical installation caring for patients (p. 49). Facilities of the Army Medical Museum were opened to all hospitals. To speed up the procurement of special information from medical literature, the Army Medical Library enlarged its facilities for the reproduction and distribution of microfilm for any medical officer or installation requesting it. Visits of civilian consultants to hospitals of service commands in the Zone of Interior were encouraged and assisted. Wartime graduate medical meetings were held under the auspices of the American College of Physicians and the American College of Surgeons, in cooperation with the Surgeons General of the Army and Navy. Medical Corps officers were encouraged to qualify themselves for certification by the American specialty boards and, wherever practical, to attend important medical meetings of both Army and civilian physicians.

Important contributions to the continuing education and training of Army medical officers were made by civilian organizations such as the American Medical Association, the State societies, the American College of Physicians, the American College of Surgeons, and other medical groups, the Rockefeller Foundation, and the Commonwealth Fund. Especially in the early months of the war, the Medical Consultants Division, OTSG, served as a coordinating agency between the Army medical officers and these civilian organizations.

INTRAOFFICE AND INTEROFFICE RELATIONSHIPS

In the large and complex organization of the Surgeon General's Office, the operations of certain services and divisions were of special importance to the Medical Consultants Division.

Personnel Service. It is obvious that accurate classification and proper assignment of professional personnel directly affects the quality of medical care furnished patients.

As has been noted (p. 17), the medical consultants' group cooperated actively in the procurement of medical officers. Many civilian internists were personally acquainted with members of the staff of the Medical Consultants Division and, in the process of becoming commissioned, made their first contact with the Army in that Division. Through such contacts, Gen-

eral Morgan assisted the Personnel Service, OTSG, by acquainting himself with the availability of individuals with special qualifications in internal medicine. Through personal knowledge of civilian physicians, he was able to select and procure for the Army, by informal means, individuals best suited to fill certain key positions. Generals Morgan and Rankin made frequent visits to civilian medical meetings in the interest of Medical Corps officer procurement during the early days of the war.

A close, effective relationship between the Medical Consultants Division and the Personnel Service was clearly essential to the proper utilization of internists by the Army. When this relationship finally received official approval, the Medical Consultants Division assumed one of its most important duties—that of determining, by recommendation, the classification and assignment of medical specialists in Army installations. This activity involved constant exchange of information between the Personnel and Medical Consultants Divisions regarding the need for and availability of medical specialists, the continuing evaluation and classification of individual medical officers with experience in internal medicine, and recommendations as to where these individuals could best be used.

The information used by the Medical Consultants Division in personnel evaluation covered many aspects of an officer's qualifications but chiefly had to do with his participation in postgraduate education and training programs and his record of professional performance. The service command consultants regularly reviewed the classification of the internists assigned to their commands, evaluating their on-the-job performance.

The Civilian Personnel Division, OTSG, was important to the Medical Consultants Division because it provided not only secretarial and clerical personnel but also civilian consultants to The Surgeon General. The role of the latter is described elsewhere in this chapter (pp. 66–67). As to the former, the Medical Consultants Division was fortunate in having capable, industrious, and loyal office employees, whose work was essential to the success of the division.

Operations Service.—The Medical Consultants Division cooperated with the Operations Service, OTSG, and the Personnel Service, OTSG, in studying the need for medical officers qualified in internal medicine in the various types of Army medical installations. These studies formed the basis for the tables of organization for numbered oversea units and for the manning guides for the fixed installations in the Zone of Interior. Unfortunately, these tables and guides proved to be unsatisfactory in the light of actual field experience. Even when hostilities ceased, they had not been revised insofar as professional personnel was concerned.

The Hospital Division of the Operations Service designated hospitals to receive certain types of patients, recommended establishment of centers for the care of special disorders, and evolved and administered plans for the transfer of patients from one hospital to another. Under the leadership of the Hospital Division, group visits to selected hospitals throughout the Zone of Interior

were made by representatives from the Medical Consultants Division, the Surgical Consultants Division, and certain other divisions within the Surgeon General's Office. The Hospital Division frequently requested the Medical Consultants Division to recommend administrative changes which would result in more efficient management of medical patients. The relationship between the Medical Consultants Division and the Operations Service was extremely cordial, to the greater effectiveness of both divisions in relation to the care of the sick. This was the state of affairs during the last 18 months of the war. It is unfortunately true that, during 1942 and 1943, opportunity for cooperative endeavor of this sort was very limited.

Supply Service.—In the earliest days of his assignment, Colonel Morgan was asked his opinion concerning medicinal agents for use in the Medical Department of the Army. To a somewhat lesser extent, he and his staff became concerned also with the distribution of medicines and items of equipment to the various medical installations in the Army. As the war continued, the Supply Service, OTSG, requested the Medical Consultants Division's cooperation in the review of tables of equipment with a view toward adding new items, including medicinal agents, and deleting old ones no longer in demand. The Medical Consultants Division was often asked for an opinion on the use of non-standard medical items. From time to time, it provided background information and assistance in developing therapeutic agents and in expanding production. The development of production facilities for penicillin, streptomycin, and blood plasma was obviously a matter of great concern to the Division.

Other services and divisions.—The Medical Consultants Division and the divisions representing preventive medicine, surgery, and neuropsychiatry cooperated closely in the formulation of professional policies. This cooperation was essential to the planning of a balanced professional program. The Medical Consultants Division regularly gave assistance also to the Physical Standards Division, OTSG, in refereeing questions pertaining to borderline physical findings in military personnel. It cooperated actively with the editor of the *Bulletin of the U.S. Army Medical Department* in the preparation, approval, and editing of professional material for dissemination to the field and with the Technical Information Division, OTSG, in reviewing professional articles submitted for publication and also material to be released to public information mediums. In addition, the Medical Consultants Division was called upon from time to time to advise and assist other divisions of the Surgeon General's Office in the preparation of bulletins and manuals for dissemination to the Armed Forces. Such a publication was FM 21-11, *First Aid for Soldiers*, 7 April 1943. The Medical Consultants Division cooperated with the Surgical Consultants Division, OTSG, in preparing the manuscript and supervising the collection of data. A large part of TM 8-500, *Hospital Diets*, published in March 1945, was prepared under the Medical Consultants Division's direction.

Special boards.—The Medical Consultants Division, OTSG, provided members for a number of special boards, five of which were of special interest to the Division.

1. *Board to prepare, develop, and implement the medical portion of the War Department's program for aid to civilian populations in liberated countries.*—This board was established on 28 June 1943, by Office Order No. 419, OTSG, U.S. Army. Colonel Dieuaide of the Medical Consultants Division, served on this board until after the end of the war. In many meetings, supplemented by individual interim study, comprehensive plans were developed for furnishing medical supplies to civilian populations in the countries to be liberated by Allied forces. Items to be included in various supply assemblies were carefully selected, and instruction sheets were prepared by Colonel Dieuaide outlining the purposes and recommended method of using these supplies, particularly drugs.¹⁸

2. *Board for Review of Books and Periodicals.*—The Medical Consultants Division was represented on this board by General Morgan and Colonel Shull, chairman and secretary respectively.¹⁹ The board provided reviews by appropriate professional authorities of all medical textbooks and periodicals submitted by publishers to The Surgeon General for purchase. It recommended to The Surgeon General medical textbooks and journals for the libraries of Medical Department installations of all types and, at regular intervals, revised the recommended list. The board also provided the Supply Service, OTSG, with authoritative opinion when requisitions were received for nonstandard books and journals.²⁰ The consultants in medicine throughout the Army stimulated commanding officers to provide libraries in Army hospitals with adequate physical facilities and personnel and to supplement the supply of books where local funds were available for that purpose.

The actual delivery of journals to oversea installations remained a problem throughout the war (p. 45). The Board for the Review of Books and Periodicals finally arranged for the direct mailing of journals by the publishers to the individual units. This was found to be an improvement in the theaters where it was tried, but no genuinely satisfactory method for the continuing and prompt distribution of current journals and books to Army libraries was developed during World War II.

The Board for the Review of Books and Periodicals also took a lively interest in a method, developed by the Army Medical Library, for the rapid transmission of professional data on microfilm to medical installations in the Zone of Interior and overseas. This very important aid to professional education and training was one of many successful efforts of the Army Medical

¹⁸ TB MED 149, 17 Mar. 1945, subject: Descriptive List of Drugs and Chemicals in Far East CAD Units.

¹⁹ Office Order No. 350, OTSG, U.S. Army, 4 June 1943, subject: Board for the Review of Books and Periodicals.

²⁰ (1) Circular Letter No. 158, OTSG, U.S. Army, 27 Nov. 1942, subject: Medical Books. (2) Circular Letter No. 126, OTSG, U.S. Army, 16 July 1943, subject: Medical Books and Journals, Including Authorization for Limited Local Procurement. (3) War Department Supply Bulletin 8-3, 21 Mar. 1944, subject: Medical Department Professional Books. (4) War Department Supply Bulletin 8-4, 21 Mar. 1944, subject: Medical Department Professional Journals. (5) War Department Supply Bulletin 8-20, May 1945, subject: Medical Department Professional Books.

Library to project its influence into the oversea theaters and, in rare instances, even to individual medical officers assigned to combat units. Facilities were enlarged at the Army Medical Library for photoduplication, and projectors for reading the microfilms were made available to all Army installations.²¹

3. *Board for Study of the Clinical Treatment of Malaria.*—The initiation of clinical studies of malaria treatment was impeded by the opinion of a few medical officers in high position that sufficient knowledge was already at hand, based on prewar experience of the Army in the Tropics. Early attempts to modify this sentiment were unsuccessful. Finally, on 15 November 1943 in Office Order No. 890, The Surgeon General appointed a special board to supervise studies in the field of malaria. Colonel Dieuaide served on this board. Trials of eight plans of treatment for malaria were conducted at Bushnell General Hospital, Brigham City, Utah, Kennedy General Hospital, Memphis, Tenn., Percy Jones General Hospital, Battle Creek, Mich., and Harmon General Hospital. Plasmochin naphthoate was one of the drugs especially studied in the hope of curing malaria caused by infection from *Plasmodium vivax*. The Plasmochin naphthoate method was unsuccessful, as indicated in the final report of the board, dated 26 March 1944.²²

4. *Board for the Coordination of Malarial Studies.*—Early in November 1943, an interservice Board for the Coordination of Malarial Studies was created by joint action of the Director, Office of Scientific Research and Development; the Director, National Research Council; and the Surgeons General of the Army, Navy, and U.S. Public Health Service. This board continued the functions of the Subcommittee on Malaria of the National Research Council and established means for direct collaboration with the services. It was brought into existence because the usual consultative arrangement with committees of the National Research Council was found inadequate in the face of the complexities and size of the malaria problem then confronting the armed services. Colonel Dieuaide, on the recommendation of General Morgan, was appointed by The Surgeon General of the Army as a member of this board and served until after the end of the war. The Malaria Board, as it was called, was a clearinghouse for all available information about malaria, as well as a forum for the discussion of plans and a directing body for the supervision of research in the field (fig. 17). Through the Malaria Board, most of the planned studies of malaria treatment in the Army in the United States, and to a less extent overseas, were coordinated with research carried on outside the Army. The Board for Coordination of Malarial Studies published several volumes of malaria reports from 1943 to 1946. Of 600 numbered reports approximately 90 were contributed by various Army sources. Although the efforts of the board failed to disclose any new curative drug, several powerful and important new drugs

²¹ (1) Monocular Microfilm Viewer. The Army Medical Library Microfilm Service. Bull. U.S. Army M. Dept. 74: 118-119, March 1944. (2) Journals Available on Microfilm. Bull. U.S. Army M. Dept. 75: 12 Apr. 1944. (3) Microfilming Research Material. Bull. U.S. Army M. Dept. 79: 29 Aug. 1944. (4) Microfilm Projector for Army Hospitals. Bull. U.S. Army M. Dept. 88: 62-63, May 1945.

²² Memorandum, Board for Study of the Clinical Treatment of Malaria for The Surgeon General, 26 Mar. 1945, subject: Final Report on the Treatment of Malaria.



FIGURE 17.—Collecting mosquito larvae in the field for study, 8th Medical Laboratory, Australia, 1943.

were studied (including SN-7618 and SN-8713), and the routine treatment of malaria with the drugs then available was vastly improved. Important contributions included a definitive comparison of quinine and Atabrine, which demonstrated conclusively the superiority of the latter and the determination of the optimum methods for its use.²³

5. *Board to survey and evaluate the medical problems of repatriated American prisoners of war.* With the cessation of hostilities in the Pacific, a large number of American prisoners of war were released from Japanese prison camps. The length of captivity ranged from a few days to 3½ years. The environmental conditions had varied considerably but for the most part had been extremely poor (fig. 18). Thousands died as a result of disease and starvation (fig. 19). The Medical Consultants Division believed that a careful health survey of the survivors would be of value in planning their future medical care, in preventing the spread by them of communicable diseases to families and communities, and in providing a better understanding of the changes that take place in men during exposure to such hardships (fig. 20). Accord-

²³ (1) The Board for the Coordination of Malarial Studies. Wartime Research in Malaria. Science 103: 8-9, 4 Jan. 1946. (2) The Suppressive Treatment of Malaria with Mepacrine (Quinacrine). J. A. M. A. 126: 1098, 23 Dec. 1944. (3) Quinacrine Hydrochloride (Atabrine) for Malaria. J. A. M. A. 125: 977, 5 Aug. 1944. (4) Shannon, J. A., Earle, D. P., Jr., Brodie, B. B., Taggart, J. V., and Berliner, R. W.: The Pharmacological Basis for the Rational Use of Atabrine in the Treatment of Malaria. J. Pharmacol. & Exper. Therap. 81: 307-330, August 1944.

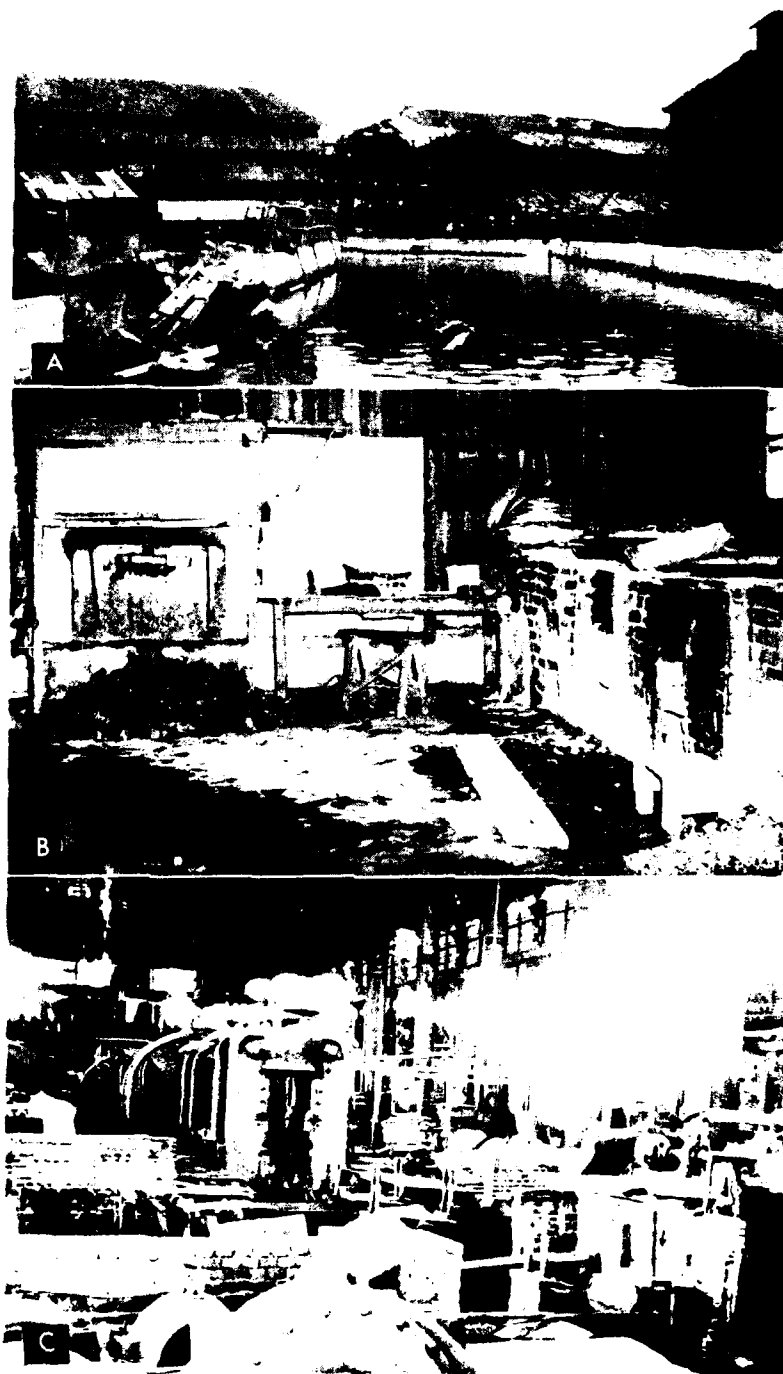


FIGURE 18. Environmental conditions for Allied soldiers at prisoners-of-war camps in Japan. A. Exterior view of quarters, left, and factory, center, Yodogawa factory detachment, Ichioka PW Camp. B. Kitchen where 100 prisoners prepared their own food, Ichioka PW Camp. C. Yodogawa factory where prisoners worked, Ichioka PW Camp.



FIGURE 18. (Continued). D. Quarters, Niihama PW Camp. E. Excellent quarters by Japanese standards Zensuji PW Camp.

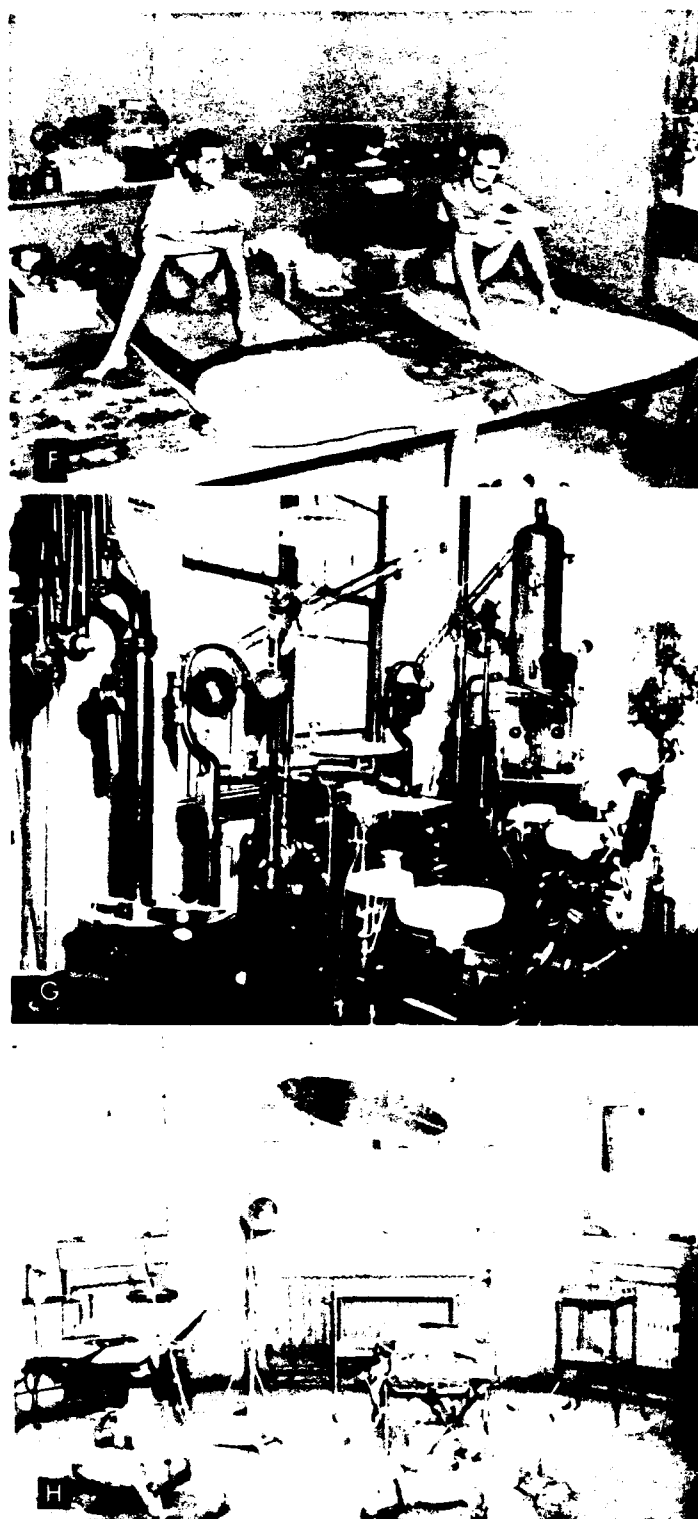


FIGURE 18. Continued. F. Interior of quarters, Zensuji PW Camp. G. Dental clinic at Umeda PW Camp. H. Operating theater at Umeda PW Camp.

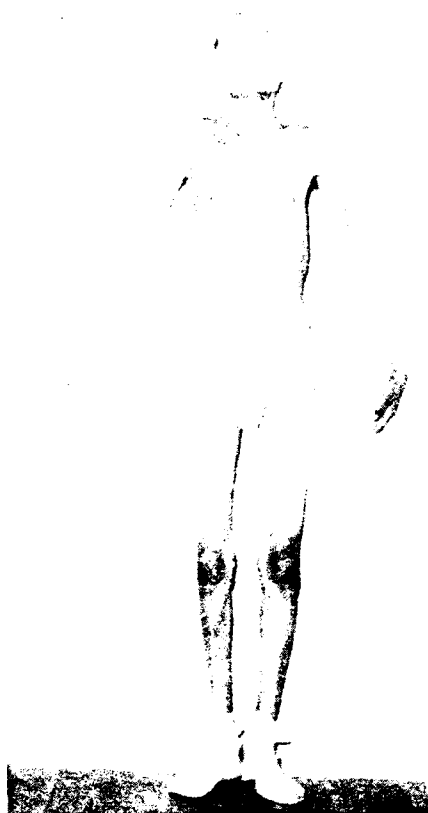


FIGURE 19.—Typical picture of malnutrition in an American prisoner of war recovered in Japan.

ingly, in Office Order 218, dated 30 August 1945, The Surgeon General established a board to survey and evaluate the medical problems of repatriated American prisoners of war returning from the Far East. General Morgan served as president of this board, Colonel Wright as coordinator, and Captain Hunt as recorder. The work of the survey teams that made the study and the results of the undertaking are described in a published report.²⁴

Army Air Forces.—Contact between the offices of The Surgeon General, the Air Surgeon, and, to a lesser extent, the Surgeon, Army Ground Forces, was not close. This was a reflection of the separation by command boundaries and the compartmentation of responsibilities in the various fields of Army medicine which existed at the beginning of World War II. In spite of the inherent difficulties, the Medical Consultants Division attempted to serve the Air Surgeon and the Ground Surgeon, as well as The Surgeon General of the Army. The organizational and physical separation of the offices rendered the efforts difficult and, on the whole, unrewarding.

²⁴ Morgan, H. J., Wright, I. S., and Van Ravenswaay, A.: Health of Repatriated Prisoners of War from the Far East. J.A.M.A. 130: 995-999, 13 Apr. 1946.



FIGURE 20. Processing recovered Allied prisoners of war at 42d General Hospital, Tokyo, Japan. A. Prisoners arriving. B. Superficial skin examination.



FIGURE 20. Continued. C. Disinfestation of clothing.
D. Taking a medical and social history.

In the fall of 1942 and spring of 1943, service command medical consultants in the Zone of Interior regularly visited Air Force hospitals. However, autonomy of Air Force operations, coupled with misunderstandings which occasionally grew out of the consultants' suggestions designed to improve the quality of medical care or to change medical officer assignments, often resulted in friction. When friction occurred, it almost invariably involved administrative or command personnel rather than the professional personnel in hospitals. Because of such friction, medical consultants in certain service commands ceased visiting Air Force medical installations.

Fortunately, the value of these visits by professional consultants was apparent to Air Force clinicians. Therefore, the Air Surgeon established a system of consultation within the Air Forces, with visits by the senior clinicians in Air Force regional hospitals to the smaller hospitals in their areas.²⁵ The Air Surgeon also appointed consultants who functioned in his office much as did medical consultants in the Surgeon General's Office. The relationship between the consultants in the Air Surgeon's Office and those in the Surgeon General's Office was good, and many professional problems which would have been difficult to consider through regular channels were handled well on an informal basis. Examples of cooperative undertakings carried on in spite of administrative difficulties are clinical observations on atypical lichen planus, clinical trials of penicillin in certain infections, notably gonorrhea, and observations on the management of rheumatic fever and other diseases related to streptococcal infection. There was little cooperation between the two offices with regard to the assignment of specialists. During World War II, The Surgeon General of the Army had virtually no control over the professional personnel of the Army Air Forces.

Army Ground Forces.—In the Army Ground Forces, the importance of the quality of professional medical services was overshadowed in the early months of Army expansion by more pressing quantitative needs and the necessity for field training of medical officers. It is unfortunate that no professional consultants regularly visited Ground Force units in training in the United States. It was not until the early months of 1944 that the consultants divisions of the Surgeon General's Office participated in personnel selection and assignment to the professional staffs of numbered hospital units destined for oversea service with the Ground Forces. The training program for medical officers in these units emphasized physical conditioning and practice in triage and transportation and evacuation of patients, especially the wounded, but little emphasis was placed upon the curative treatment of disease and injury with prompt return of the soldier to duty (fig. 21). Thus, the primary mission of the Medical Department in time of war—the maintenance of the lowest noneffective rate possible—was often neglected. The emphasis upon surgery

²⁵ This system was also in operation in certain Army Service Forces hospitals as a supplement to the consultation provided by the service command consultants.

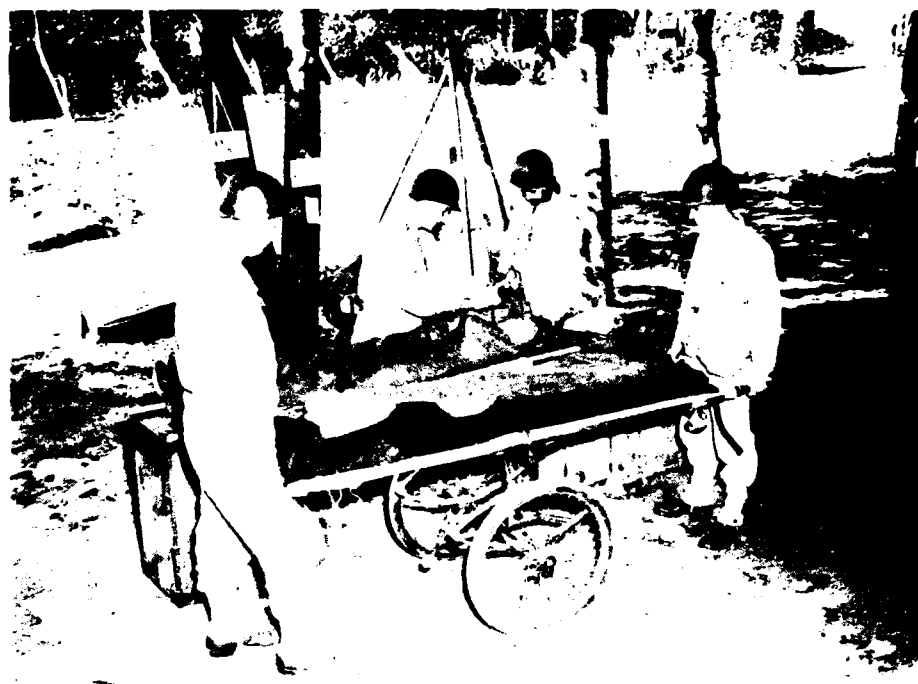


FIGURE 21. Training in triage and evacuation of wounded. Placards on trees announce (left to right): "Capt. MC," "1st Lt. Med. Officer," "Litter wounded," and "Water." Lawson General Hospital, Atlanta, Ga., September 1943.

in the manning tables for numbered hospitals destined to function with combat troops in the theaters of operations is understandable, but it often proved to be unrealistic (fig. 22). The number of surgical patients returned to duty from hospitals in the theaters of operations was small indeed when compared with the number of medical patients returned. The greatest contribution to the maintenance of the lowest noneffective rate possible came from medical officers, who were concerned with the prevention and cure of disease.

American National Red Cross. Contacts between the Medical Consultants Division and headquarters of the American National Red Cross and between consultants in medicine in the field and Red Cross field representatives were frequent, cordial, and mutually beneficial. The Medical Consultants Division, through Colonel Dieuaide, assisted the Red Cross in formulating lists of drugs to be included in packages for delivery to American prisoners of war in enemy hands. Accompanying these packages was a statement prepared by Colonel Dieuaide describing in lay terms the indications for dosage of these drugs.²⁷

²⁷ American Red Cross. "Brochure of Instructions for the Use of Drugs Contained in the Personnel Unit of the Medical List for American Prisoners of War in the Air Force," May 1944.



FIGURE 22. Emphasis on surgery during training. Actual operation under field conditions in a mobile hospital unit attached to Lawson General Hospital, Atlanta, Ga., January 1944.

RESEARCH

In the early days of the emergency, The Surgeon General, while urging full use of civilian research facilities, discouraged efforts to carry on planned and coordinated clinical investigation in the Army. This official attitude appeared to be due to a number of factors. There was enormous pressure to meet the practical medical needs of the rapidly expanding Army, and, although important scientific research had been done in the past by Army officers, the tradition of clinical research was not established in Army thinking. The function of the Medical Corps in time of war was generally judged to be the optimum application of knowledge already available, not research and discovery. Moreover, the National Research Council, which the National Academy of Sciences had established in 1916 for the benefit of Government agencies, was fully organized and geared to a high degree of activity.²⁷ During World War II and the emergency period preceding it, the committees of experts of the National Research Council were available to the Medical Department for consultation and for the planning and actual execution of research projects.

²⁷ The National Academy of Sciences was a private nonprofit organization of scientists recognized by act of Congress and by President Lincoln in 1863 to further science and to advise the Federal Government in scientific matters upon request.

As the war progressed, the need for answers to medical problems, both new and old, became increasingly urgent. The facilities of the National Research Council were used widely. It may be said that without this help the Medical Consultants Division, in relation to many problems, would have functioned often in a vacuum and almost always would have been less effective. The Committee on Chemotherapeutics and Other Agents, together with its special subcommittees, gave invaluable assistance, especially in regard to the sulfonamides, penicillin, and streptomycin. Also, the Committee on Medicine and each of its Subcommittees on Tuberculosis, Infectious Diseases, Clinical Investigation, Cardiovascular Diseases, and Medical Nutrition assisted the Medical Consultants Division in solving problems in these specific fields. The Subcommittee on Tropical Diseases initiated and coordinated investigations in its field. Upon official request of The Surgeon General, the following topics of special importance to the Medical Consultants Division were made the subject of study and reports by the appropriate committees: Amebiasis, schistosomiasis, leishmaniasis, filariasis, malaria, poliomyelitis, and tuberculosis; the treatment of ill effects of heat upon troops; the treatment of venereal diseases; the use of sulfonamide drugs; the use of penicillin and of streptomycin; and the management of fungus infections of the skin.

The facilities available to the National Research Council for its study of Army medical problems were confined, in large measure, to civilian institutions. As the Army was organized and administered in World War II, it was not practicable for the National Research Council systematically to carry on studies in military installations. Nevertheless, many of the problems facing The Surgeon General had special military aspects that could be studied only in Army installations.

The need for such clinical studies, initiated and directed by the Medical Consultants Division, was evident when War Department technical bulletins were in preparation. These official publications were intended to guide medical officers throughout the Army in diagnosis, treatment, prognosis, and disposition of soldiers with certain medical disorders. In many instances, information was not available for specific statements and directions regarding the particular professional problems seen by the Army. The choice of the Medical Consultants Division was either to depend upon impressions, guesses, and conclusions arrived at on hypothetical grounds or to make studies designed to provide the answers. It was extremely difficult to do the latter at any time during World War II.

The criteria for the early diagnosis of infectious hepatitis constitute a case in point. There was little information in the medical literature, and that little was not certainly applicable to the disease as it was experienced by the Army. It was soon apparent that the patient with hepatitis should have prompt and prolonged hospital care, but there were many uncertainties concerning diagnostic laboratory procedures. Even the piecemeal information available on these points reached the Medical Consultants Division by means so indirect and slow that the problem was never completely and satisfactorily solved,

although useful information was obtained through civilian consultants and Army personnel in selected hospitals. Patients with naturally acquired infectious hepatitis were not seen in sufficient numbers in Zone of Interior installations, nor were enough qualified investigators ever concentrated in one or more of the oversea commands to permit thorough study of the problem.

Such research as was undertaken in Army installations in the management of disease was often fragmentary and poorly coordinated. There was no established administrative machinery for carrying out these studies. The initiation of each project required special approval, special arrangements for equipment and personnel, special instructions to the commanders of the installations concerned, and the approval of several organizations within the Surgeon General's Office. It was difficult to get information about clinical research in oversea commands because early in the war there were no direct channels of communication between the field installations and the Medical Consultants Division. It is true that clinical investigation carried out both in the Zone of Interior and in oversea theaters was excellent, but investigators were often hampered and their accomplishments rendered less valuable to the Army as a whole because means of communication and coordination were tenuous or nonexistent. The Medical Consultants Division was especially sensitive to this serious handicap in relation to its problems with malaria, filariasis, schistosomiasis, hepatitis, and penicillin.

The following are examples of clinical research with which the Medical Consultants Division was actively concerned:

1. *Hepatitis*.—In the spring of 1942, numerous cases of infectious hepatitis occurred in soldiers who had been vaccinated for yellow fever. The Medical Consultants Division succeeded in obtaining the assignment of four medical officers to four separate Army hospitals to observe the clinical course and the effects of various forms of treatment. These studies provided early clinical experience in a problem that was to develop into one of great magnitude and importance.

The Division encouraged as best it could the extensive field studies on hepatitis which were carried out under difficult circumstances in the Zone of Interior.

2. *Tropical diseases*.—Extensive and valuable clinical observations and therapeutic trials were made in the field of tropical medicine, especially at Moore and Harmon General Hospitals and in the Pacific. Such studies increased knowledge of filariasis and of schistosomiasis and gave information of the greatest practical value on the use of Atabrine in malaria. From the Southwest Pacific in 1944 and 1945, large numbers of patients were returned to this country with an unusual skin disorder, which came to be called atypical lichen planus. A concise, clear-cut clinical description eventually resulted from carefully organized studies of related groups of cases in hospitals in this country as well as overseas.

3. *Trenchfoot*.—Selected hospitals, manned and equipped for the purpose, made special studies of a great many trenchfoot patients returned from the

European theater. These studies yielded useful information applicable throughout the Army.

4. *Penicillin and streptomycin*.—The Medical Consultants Division was active in planning and developing within the Army opportunities for studying the use of penicillin. Studies on the absorption, excretion, and methods of prolonging the action of penicillin were carried forward at two specially designated Army hospitals, Walter Reed General Hospital, and Fort Bragg Regional Hospital, Fort Bragg, N.C. As the war closed, extensive observations on the use of a newer antibiotic, streptomycin, were under way.

By the spring of 1945, there was fairly widespread acceptance of the concept that it is the province and duty of the Medical Department of the Army to pursue actively, by whatever means available, clinical research in Army hospitals and laboratories. There was increasing (but never complete) agreement in the Surgeon General's Office that it was sound and proper policy to establish facilities and assign medical personnel for this purpose. Earlier efforts made in this direction from time to time had met with resistance or failure. Members of the Medical Consultants Division and others contended that establishment of a special board, within the framework of the Surgeon General's Office, composed of Medical Corps officers with research interest and training, would facilitate research undertakings. Establishment of such a board, to be designated the Army Board for Clinical Research, was formally proposed by the Medical and Surgical Consultants Division in March 1945, with the belief that its creation would strengthen and extend administrative provisions then existing for the initiation, supervision, and coordination of research by The Surgeon General. The proposal was not approved during the war.

VISITS TO SERVICE AND OVERSEA COMMANDS

From the beginning, it was apparent that firsthand knowledge of the problems of medicine as encountered in the field was essential if a bureaucratic, theoretical approach was to be avoided. Experience strengthened this opinion (fig. 23). Accordingly, General Morgan, during his tour of duty in the Army, spent approximately one-half of the time in the field, including more than 8 months in oversea theaters. As the Medical Consultants Division, OTSG, grew, the chiefs of branches also made frequent field trips. Thus, personal contact was maintained with the medical consultants assigned to service commands, theaters, and armies.

In 1942, General Morgan attended Army maneuvers in the California desert (fig. 24). During this year and subsequently, he and members of his division made frequent visits to the nine service command headquarters and the medical units (general and station hospitals) in these commands (fig. 25). In 1943, General Morgan visited the North African theater; the Middle East theater, including Egypt, Eritrea, Palestine, and the Persian Gulf Service Command; the China-Burma-India theater; the Southwest Pacific Area (Australia, New Guinea); and the Hawaiian Islands. Colonel Dieuaide visited the



FIGURE 23. Brig. Gen. Hugh J. Morgan visiting Col. Frank W. Wilson, MC, Moore General Hospital, Swannanoa, N.C., 1944.

Pacific in 1943-44 to survey the tropical disease problems in general and malaria in particular. In 1944, Colonel Turner of the Communicable Disease Treatment Branch visited the Mediterranean theater to study infectious hepatitis. In the spring of 1945, General Morgan visited the European and Mediterranean theaters, and, after V J Day, accompanied by Colonel Dieuaide, he visited the following commands: U.S. Army Forces, Pacific (including U.S. Army Forces, Western Pacific, and the Sixth and Eighth U.S. Armies, which were then occupying the Japanese islands), and the China theater.

The value of these visits to field headquarters and installations may be summarized as follows:

1. Through direct contacts between the chief consultant and his assistants and the medical consultants and command surgeons in the field, the visits promoted unity of purpose and mutual understanding and confidence.
2. They were a means for direct and immediate interchange of ideas and information that were often of Armywide significance.
3. They improved specialized personnel management within commands and between commands.
4. To some extent, they associated the Medical Corps officers in field assignments in remote places with The Surgeon General and his headquarters organization. At the least, they were interpreted as a token of the interest of The Surgeon General in all of the officers of the Medical Department.
5. They brought to the attention of the commanding officers of major



FIGURE 24.—Maneuvers in California desert. Armored halftracks approach Blythe, Calif., 7 October 1942.

and subsidiary commands the functions of The Surgeon General and his office in relation to the Army as a whole.

6. They encouraged, by example, a continuing and lively interest in clinical problems. Time and time again, medical officers expressed appreciation for visits made by individuals from the Surgeon General's Office to the bedside of sick or injured patients. Inspections by men in high position in the Army often completely ignored the actual care of the sick or injured soldier and the clinical problems incident thereto. This care was the chief activity of the majority of medical officers, and they rightly viewed it as their primary mission. The morale and performance of these officers were improved when The Surgeon General or his representatives took a similar view.

7. They bridged the chasm which inevitably develops between the men in field assignments and the headquarters group.

8. They brought to the Surgeon General's Office the problems of the field for such contributions to their solution as could be provided.

It should be stated that administrative duties in the Surgeon General's Office did not permit enough visitation by the staff to field units, whether in the Zone of Interior or overseas. In addition, visits to oversea installations were often discouraged by the War Department and, at times, by the oversea theaters.

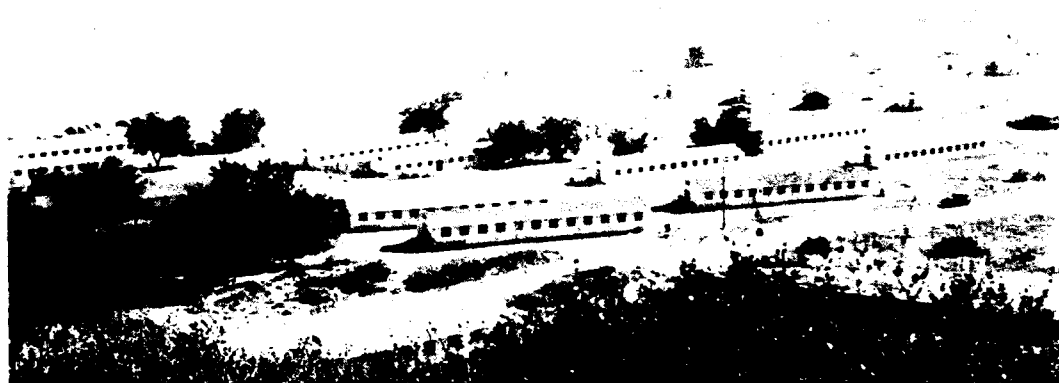


FIGURE 25.--Medical installation, Ninth Service Command. Hospital (foreground) of Desert Training Center, Calif., 1943.

CIVILIAN CONSULTANTS IN MEDICINE

Every effort was made by The Surgeon General to bring into the Medical Department of the Army the best personnel available and to choose from them military consultants for assignment to commands in the field. The demands of medical education, research, and practice in civilian life, however, were so great that many eminent specialists in medicine were required to remain at their civilian posts. Moreover, many who were anxious to serve in the Army could not meet Army physical requirements. Through membership in the National Research Council committees, the services of most of these specialists were made available to The Surgeon General. In the early years of the war, much good for the Army was accomplished by informal contacts and personal correspondence between the chief consultant in medicine and his staff and this group of physicians. In January 1944, General Morgan recommended, and The Surgeon General approved, the formal appointment of civilian consultants in medicine to The Surgeon General. These consultants were recognized authorities in the fields of gastroenterology, cardiovascular diseases, dermatology, infectious diseases, chemotherapy, allergy, tropical diseases, and tuberculosis. In subsequent months, as special needs arose, additional consultants in special fields were appointed, as follows: In November 1944, a consultant each in hepatic diseases and in tropical medicine; in January 1945, an additional consultant in dermatology; and in March 1945, a consultant in vascular diseases. The internists who served as civilian consultants to The Surgeon General during World War II are listed in appendix C, p. 839.

General Morgan, his staff in the Surgeon General's Office, and the military medical consultants in the field were aided greatly by the civilian consultants. Through these consultants, both medical societies and individuals had direct access, through official channels, to The Surgeon General and the chief consultant in medicine, and developments in civilian medicine were immediately available to the Army. Frequently, advice on urgent matters was asked by letter or telephone. The civilian consultants prepared material to be incorporated in War Department technical bulletins for Armywide distribution; they attended conferences with the Medical Consultants Division and the service command consultants; and they offered suggestions and recommendations regarding Medical Department administrative procedure and professional practices. In short, they provided a close and effective liaison between civilian medical practice and research and Army medical practice and research, to the great benefit of both. Occasionally, the civilian consultants were ordered on active duty as commissioned officers with the Army for a few days, following which they submitted comments and recommendations regarding the problem at hand. They visited Army hospitals in the Zone of Interior in company with the military consultant of the command. Such visits, made jointly by civilian and military consultants, were found to be stimulating to the morale and professional performance of medical officers on duty in hospitals. It should be recorded that each of these civilian consultants gave freely and willingly of time and knowledge. Their extraordinary competence and their availability made them a valuable source of advice and professional assistance for the Surgeon General's Office and for medical officers in the field. Their appointments were terminated as of 31 December 1945.

PLANS FOR THE POSTWAR ARMY

Planning for the Medical Department.—General Morgan and his colleagues in surgery and psychiatry devoted a great deal of thought and energy to plans for retaining an adequate number of properly trained general medical officers and specialists in the postwar Army in order to preserve the excellent wartime standards of professional care. The problem was the procurement of specialized personnel for the Army Medical Corps. Suggestions and recommendations were submitted as early as 1942 and were resubmitted periodically.²⁸ These suggestions involved increasing the Army Medical Corps through admission of interested officers of ability who were either certified specialists or candidates for certification. During the war, these suggestions were considered impracticable because there were few, if any, vacancies in appropriate grades and it required an act of Congress to increase the size of the Army Medical Corps. Following cessation of hostilities, there was a sharp drop in interest on the part of both the Medical Department and the personnel under consideration.

²⁸ Memorandum, Chief Consultant in Medicine for Director, Historical Division, 14 Sept. 1945, subject: General Recommendations for the Medical Department in a Future Emergency.

Plan to continue the consultants system.—The professional consultants system, as employed during World War II, had gained general acceptance throughout the Army. The following directive, War Department Circular No. 101, was published 4 April 1946, months after cessation of hostilities and at a time when demobilization of the Army was well under way. Indirectly, it is an appraisal of the consultant system in the form of a statement of what the Army had come to expect of it and how the Army planned for continued operation of the system in the postwar period.

III. PROFESSIONAL CONSULTANTS. 1. During World War II, The Surgeon General developed a system of utilizing professional consultants from which great benefit was derived (reference is made to paragraph 2*d*, section II, WD Circular 12, 1946). In order to insure the maintenance of the highest professional standards and to provide close liaison with leaders in the medical profession at large, this system will be continued and extended in the future. Professional consultants who are recognized experts in the medical and allied specialties, including internal medicine, surgery, neuropsychiatry, preventive medicine, dentistry, veterinary medicine, and other special medical fields, will be designated by The Surgeon General. Recommendations for appointments in connection with special subjects, such as dentistry and veterinary medicine, will be made by the senior officer in these fields. They may be either appropriate officers commissioned in the military service (Regular Army, Army of the United States, Officers' Reserve Corps, or National Guard of the United States) or qualified civilians selected to render consultant service (see par. 4). Although the provisions of this circular apply particularly to the United States, oversea commanders will utilize appropriate medical officers in their commands for similar duties *or may procure professional advice from locally available civilian medical experts.*

2. As representatives of The Surgeon General, the professional consultants are concerned essentially with the maintenance of the highest standards of medical practice. It is their function to evaluate, promote, and improve further the quality of medical care and sanitation by every possible means, and to advise in the formulation of the professional policies of The Surgeon General and to aid in their implementation. The proper performance of these functions necessarily involves an appraisal of all factors concerned with the prevention of disease and the professional care of patients, including particularly the organization and program of professional services in medical installations, the quality, numbers, distribution and assignment of specially qualified professional personnel, the diagnostic facilities including roentgenologic and laboratory procedures, the availability and suitability of equipment and supplies for professional needs, and the nursing care, dietary provisions, recreational and reconditioning facilities, and other ancillary services which are essential to the welfare and morale of patients. The professional consultants exercise their functions by assisting and advising The Surgeon General, the surgeons of major forces and commands, and the commanding officers of hospitals and other medical installations on all matters pertaining to professional practice and preventive medicine, by providing advice on professional subjects in general and on newer developments in prophylaxis, diagnosis, treatment, and technical procedures, by stimulating interest in professional problems and aiding in their investigation, and by encouraging and participating in educational programs such as conferences, ward rounds, and journal clubs, and by giving advice on matters pertaining to research and development. The execution of these functions involves periodic visits to medical installations and other types of units concerned with the medical care of military personnel. The functions of professional consultants vary somewhat according to their assignments.

a. Office of The Surgeon General. In addition to medical officers permanently assigned as professional consultants, other specially qualified individuals will be placed on temporary duty from time to time, for the purpose of rendering advice and assistance to The Surgeon

General on broad problems connected with policy and practice in the prevention of disease, the care of patients, evaluation and maximum utilization of specialized personnel, medical research, postgraduate medical education, and other important professional matters throughout the Army both in the United States and overseas.

b. *Lower echelon headquarters.* Designated professional consultants will be placed on temporary duty from time to time in service commands, Military District of Washington, and air force command headquarters for the purpose of rendering expert advice to surgeons of these headquarters. It is desirable that such consultants be individuals with military experience. Their services will be utilized regularly in connection with problems within the command which relate to the care of patients and other professional matters as indicated above.

c. *Army hospitals and other medical installations in United States.* Professional consultants will be placed on duty from time to time in Army hospitals and other medical installations in the United States which are designated by The Surgeon General to provide graduate education for medical officers in certain medical specialties. Such consultants will have the particular duties in hospitals of furthering in every possible way the educational program for the advancement of medical officers in the specialties and of maintaining the highest standards on the professional services of the installations. They may, however, be called upon by the commanding officer for any professional advice or appropriate professional assistance he may desire of them. Their services will be utilized regularly. For further information regarding the educational program of the Medical Department in the medical specialties, see AR 350-1010. Professional consultants in the various medical and allied specialties will also be used in other types of medical installations, including especially those devoted to research and development.

3. At the completion of a special mission and at such other times as may be required, each professional consultant who has been on duty shall direct a communication to The Surgeon General dealing with the functions set forth in paragraph 2, including recommendations (if any). These communications, with appropriate indorsements including those of hospital commanders and surgeons of commands concerned, will be promptly forwarded through technical channels to The Surgeon General. Indorsements will show what action has been taken on consultants recommendations and will give an evaluation in terms of the consultants services.

4. Qualified individuals designated by The Surgeon General will be utilized as medical consultants in one of two capacities—that is, either by being ordered to active duty as officers commissioned in the Officers' Reserve Corps or the National Guard of the United States in accordance with War Department policy, or by being employed as consultants holding excepted civilian appointments under the authority of the Secretary of War. The consent of the individual concerned will be obtained prior to placing him on duty. The Surgeon General will maintain up-to-date lists and from time to time inform all concerned of the names, addresses, and qualifications of medical experts selected and approved for consultant duty. He will also furnish details regarding the procedures for placing consultants on duty.

5. The above instructions are equally applicable to dental and veterinary consultants.

6. These instructions do not relate to the provision of civilian medical care, specialized or otherwise, for individual military patients at public expense, as outlined in paragraphs 3 and 4, AR 40-505.

ROLE OF THE INTERNIST IN WORLD WAR II

Among many miscellaneous topics claiming General Morgan's interest was the relative importance of the internist in the Medical Department of the Army. The topic was forced into the foreground of attention by the tendency on the part of some to emphasize the Medical Department's surgical activities in such a way as to belittle the contribution of those who cared for the sick.

This attitude on the part of laymen is not surprising, for, when their attention is directed to the Medical Department of the Army during wartime, it naturally focuses upon the wounded man and his care. Actually, the noneffective rate and the factors that affect it adversely are equally the concern of the Army Medical Department; they are, indeed, its chief concern in respect to its mission to help win wars. Viewed in this light, the wounded man, aside from the great emotional reaction experienced by all regarding his plight, of necessity assumes a position of secondary importance, for he is often noneffective for a very long time, if not permanently. Preventive and curative medicine are more immediately effective in reducing medical noneffectiveness, which fortunately constitutes the bulk of the problem of the Medical Department as a whole. In the Italian campaigns of World War II, 80 percent of noneffective soldiers returned to duty by the Medical Department were medical patients; only 20 percent were surgical. The internist, thanks to the developments in medical therapeutics since the early 1920's, has become the most effective therapist extant, and this fact is reflected in Army records.

Nevertheless, the traditional tendency in military medical planning and administration is to lay the greatest stress upon the surgical aspects of military medicine, often to the detriment or neglect of the medical aspects. General Morgan considered it one of his important duties as chief consultant in medicine to represent the professional interests and to emphasize the practical importance of the internist with the Army in the field in order to claim for himself, in the councils of the Surgeon General's Office, his proper place and to urge that he be properly recognized and adequately supported. In this position, General Morgan was strongly supported by many medical officers with field experience in the Ground Forces, notably Col. (later Maj. Gen.) Joseph I. Martin, MC, Surgeon, Fifth U.S. Army. Nevertheless, the maximum exploitation of what internal medicine had to offer in reducing the noneffective rate of troops in the field was not undertaken during World War II. To do this, a revision of the tables of organization and equipment for Ground Forces medical installations would have been necessary. In the field of psychiatry, much was accomplished in this direction during the war, with notable returns in reduction of psychiatric noneffectiveness. The Ground Forces administration of problems in the field of internal medicine during World War II differed little from the practices of 1917-18, the management of the venereal diseases being almost the sole exception. Because Army Medical Department installations were planned and administered primarily for a surgical mission, inefficiency and improvisation characterized their performance with regard to medical problems. In the theaters of operations, the lack of specialized personnel in internal medicine and the paucity of beds for the care of the sick in installations under Army jurisdiction resulted in much unnecessary evacuation to the communications zones, prolonged hospitalization, and increased noneffectiveness. The assignment of medical consultants to field army headquarters in this war was an extremely important initial step in the direction of correction. Much still remained to be done when hostilities ceased.

CHAPTER II

Service Commands

Hugh J. Morgan, M.D.

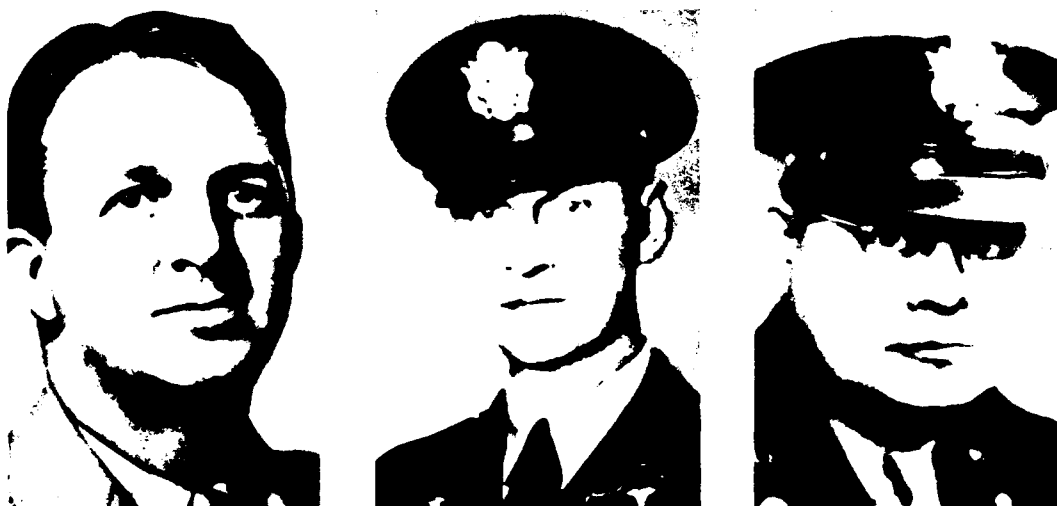
There could hardly have been found any group of Army officers of the same age and grade with more original and independent attitudes and patterns of behavior than the group selected to be service command consultants in medicine (figs. 26 and 27) by The Surgeon General on the recommendation of his chief medical consultant. However, the group had certain attributes in common. Each was distinguished in civilian medical practice and medical education; each was a loyal patriotic American, eager to serve his country; and each became a dedicated officer in the Medical Department of the Army.

A prerequisite to their selection was that the consultants be sufficiently imaginative and resourceful to grasp in broad outline a concept of the role a professional consultant might play in the Army. After commission, however, the consultants were provided with little more than officer grade and a very vague job definition for support to establish themselves and make their way in a sometimes hostile and frequently indifferent headquarters.

The role of the professional consultant in civilian internal medicine was a familiar one to these men. The knowledge, resourcefulness, tact, and perseverance which they required in civilian practice were essential also for their role as consultants in the Army. They went into their new assignments encouraged by The Surgeon General and his representatives to do for sick soldiers and the medical officers who cared for these soldiers what these consultants knew well how to do for patients and practitioners in civilian life. This assignment required not only professional ability but also ability to evaluate and manipulate professional personnel, to create an environment in Army hospitals conducive to high professional standards, to encourage continuing medical education in the Army, to stimulate prompt administrative disposition of convalescent patients, and, in every other way, to keep the Army noneffective rate from disease at the lowest possible level.

The effectiveness of the medical consultants in the earliest assignments to service commands encouraged surgeons of other commands to experiment with this new kind of officer.¹ The assignments were not mandatory. The Surgeon General had no such authority over service command surgeons. Following the prompt and conspicuous success of the consultants who were assigned to the Fourth, Seventh, Eighth, and Ninth Service Commands in August 1942, other

¹ Col. Henry M. Thomas, Jr., MC, was assigned to the Fourth Service Command on 1 Aug. 1942; Col. Walter Bauer, MC, was assigned to the Eighth Service Command on 19 Aug. 1942. Col. Verne R. Mason, MC, was assigned to the Ninth Service Command and Col. Edgar van Nuys Allen, MC, to the Seventh Service Command somewhat later in the same month. The First and Third Service Command surgeons were the last to request consultants in medicine. Officers were assigned to these service commands in January 1944.



(Left) Col. Edgar van Nuys Allen, MC, Consultant in Medicine, Office of the Surgeon, Seventh Service Command.

(Center) Col. Roger O. Egeberg, MC, Consultant in Medicine, Office of the Surgeon, Ninth Service Command.

(Right) Col. Leonard A. Dewey, MC, Venereal Disease Control Officer, Office of the Surgeon, NATOUSA; and Chief, Preventive Medicine Branch, Office of the Surgeon, Eighth Service Command.



(Left) Col. George P. Denny, MC, Consultant in Medicine, Office of the Surgeon, First Service Command.

(Center) Col. Thomas Fitz-Hugh, Jr., MC, Consultant in Medicine, Office of the Surgeon, Third Service Command.

(Right) Col. Alexander Marble, MC, Consultant in Medicine, Office of the Surgeons, Sixth and Eighth Service Commands.

FIGURE 26. Consultants in medicine, Service Commands.



(Left) Col. Frank D. Adams, MC, Consultant in Medicine, Office of the Surgeon, Fourth and Fifth Service Commands.

(Center) Col. Richard P. Stetson, MC, Consultant in Medicine, Office of the Surgeon, Fourth Service Command.

(Right) Col. John Minor, MC, Consultant in Medicine, Office of the Surgeon, Third Service Command.



(Left) Col. Johnson McGuire, MC, Consultant in Medicine, Office of the Surgeon, Fifth Service Command.

(Center) Col. Roy H. Turner, MC, Consultant in Medicine, Office of the Surgeon, Third Service Command; Consultant in Medicine, Office of the Surgeon, USAFWESPAC; and Consultant in Medicine, Office of the Surgeon, USAFPAC.

(Right) Col. Irving S. Wright, MC, Consultant in Medicine, Office of the Surgeon, Sixth and Ninth Service Commands.

FIGURE 27. Consultants in medicine, Service Commands.

commands requested consultants, despite the fact that early in the war no position vacancy existed for them in the allotment of medical officers for service command headquarters. Consequently, the presence of a consultant used a position vacancy designed for other purposes and blocked promotions.

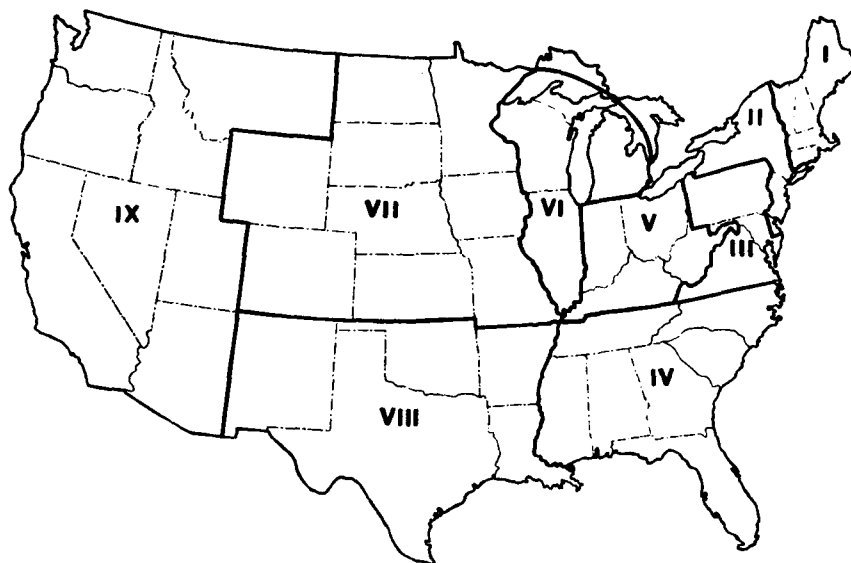
It should be pointed out that the success of the consultant system in the Zone of Interior during the early training phase of the war paved the way to a large extent for its adoption later within the communications zones and finally by the armies within the various theaters of operations. A conspicuous exception was the consultant system adopted quite early in ETOUSA (European Theater of Operations, U.S. Army). Under the guidance of Maj. Gen. Paul R. Hawley, Chief Surgeon, ETOUSA, and Col. William S. Middleton, MC, and Col. (later Brig. Gen.) Elliott C. Cutler, MC, Chief Consultants in Medicine and Surgery, ETOUSA, respectively, there developed consultant coverage that was ready for and kept pace with the rapidly expanding European Air and Ground Forces in World War II. The professional consultant system reached its fullest development and maximum efficiency in the European theater.

The names of the medical consultants in the Zone of Interior and the service commands in which they served are listed in appendix A (p. 829).

In the preparation of this chapter, full use has been made of the service command consultants' final reports which were prepared at the request of the Medical Consultants Division, OTSG (Office of the Surgeon General), at the termination of the fighting and just prior to the separation of the consultants from military service. All of the reports have been helpful, but special mention should be made of the report, *Activities of the Medical Consultants in the United States*, prepared by Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service Command, from August 1942 to August 1945.

DUTIES OF MEDICAL CONSULTANTS

The service commands varied greatly in size, from the relatively small First Service Command of the northeastern seaboard to the huge western Ninth Service Command (map 1). Because of the geographic area included in the more extensive commands, consultants found it almost impossible to visit even the larger hospitals with any frequency. Problems encountered in commands with large areas and populations and the means used for meeting these problems were discussed in the final report of Colonel Bauer. He summarized the scope of the activities of the service command consultants as the consultant program evolved in the different commands. Also, he commented on the jurisdictional conflict regarding medical administrative authority, which plagued The Surgeon General and the Air Surgeon and their offices during the war and which was brought into sharp focus by the medical consultants, whose chief concern was the improvement of the quality of medical



MAP 1.—Service Commands, Zone of Interior, during World War II.

care received in military hospitals.² The following paragraphs summarize his observations and recommendations.

The magnitude of the task to be performed by a service command consultant in a given service command depended on the wishes of the service command surgeon, the size of the area, the available transportation facilities, the number and type of installations, and the total troop strength. In one of the larger service commands, the surgeon desired that the consultant be responsible for the supervision of internal medicine, including all subspecialties except neuropsychiatry. He was to serve all fixed Medical Department installations within the geographic limits of the service command, including Army Air Force installations, induction stations, reception centers, replacement centers, internment camps, and, when necessary, Army-owned or Army-operated industrial plants. Even though the consultant worked rapidly, it was impossible for him to visit approximately 150 installations in a year's time. Experience soon demonstrated that, unless he could visit each installation at least every 2 months, he could not achieve maximum professional effectiveness. This assignment was in marked contrast to those of the smaller service commands, where it was possible to maintain the desired schedule with relative ease.

In the event of another national emergency, every effort should be made to correct such gross discrepancies. One or more additional consultants should be provided in the table of organization (manning tables) of at least the larger service commands. Designation of an assistant by the

² In fairness to Air Force hospital commanders and hospital staffs, it should be said that proximity to patients diminished the intensity of feeling which characterized higher echelons. If left to themselves at the operational level in the field, the service command medical consultants and the Air Force hospital commanders and staffs functioned together well with benefit to the patients and everyone else concerned.

consultant, with the approval of the service command surgeon, would assure harmony. This arrangement would increase the frequency of hospital visits and provide for the continuous presence of a qualified professional consultant at headquarters.

Since no provision was made for additional service command consultants, a substitute plan was developed by the Eighth Service Command in 1944. Each of the regional and general hospitals, with the approval of the Surgeon, Eighth Service Command, designated a competent internist, usually the chief of the medical service, to serve as consultant to its satellite stations. By having these regional consultants visit the smaller hospitals every 8 weeks, it was possible to provide better supervision of clinical activities, more intimate association with the parent institution, and more frequent consultations. Once this plan was in effect, the service command consultant was able to maintain the desired contact with those installations (general, regional, and large station hospitals) responsible for the care of most of the service command patients. His association with the medical officers of the satellite hospitals continued through the medium of educational exercises held at the time of his visits to the parent institution. At a later date, the more competent service command specialists in radiology, dermatology, neuropsychiatry, ophthalmology, and otology were also directed to visit the larger hospitals. These augmentations of the consultation service proved very effective and were adopted by several other service commands. The chief advantages were more frequent visits to all hospitals, greater exchange of professional experiences, and, most important of all, higher quality of medical service for every sick soldier regardless of his location.

The consultants, having been instructed to visit all medical installations in their service commands, rightfully assumed that their relations with the Army Air Force hospitals were to be the same as with installations of the Army Service Forces. They were at the outset. However, in March 1944, the Commanding General, Army Air Forces, specifically requested that the service command consultants visit the Army Air Force installations only upon request and then for the sole purpose of teaching and holding clinics. This action marked the termination of the initial plan except in the Eighth Service Command, where the surgeon of that command insisted that the consultant continue as before or discontinue all contact with the Army Air Force installations. In a few of the other service commands, the visits were continued on a limited scale but only because medical officers assigned to the Army Air Force hospitals urgently requested that this profitable medical experience be continued. In retrospect, this action by the Army Air Forces appears very unwise, since no substitute for the service command consultant was provided until the closing months of the war and then only on a restricted scale. This and similar experiences at the ports of embarkation indicate the need for definitive statements of policy regarding the function of the consultant in the other installations under separate commands (fig. 28). The needed integration of all the medical services located in a service command cannot be achieved otherwise.



FIGURE 28. Typical scene at a port of embarkation. Livestock Pavillion Staging Area, San Francisco Port of Embarkation, Calif., 1942.

Each consultant was free to adopt the methods of procedure that he deemed suitable to the needs of his own service command. Helpful suggestions were received from many sources, the most important being the service command surgeons; the Chief Consultant in Medicine, OTSG, and his staff; fellow consultants; and the commanding officers and staffs of many of the hospitals visited. The yearly conferences of the consultants afforded them excellent opportunity to discuss mutual problems.

The scope of the consultants' activities as finally evolved included supervising the professional activities of the medical services and the allied specialties previously mentioned; advising the service command surgeon on all professional matters; maintaining close liaison with the chief consultant in medicine in the Surgeon General's Office; assigning medical officer personnel; fostering educational programs; coordinating medical consultant activities with those of the consultants in surgery, neuropsychiatry, and orthopedic surgery; consulting frequently with the other divisions of the medical branch; reviewing clinical records and autopsy protocols; performing the necessary editorial duties; aiding in the control of epidemics; and being available on request by the commanding officers of hospitals as consultants on unusual or complicated cases.

Many of the consultants' fields of activity overlapped; the time devoted to each depended on its relative importance. Initially, the consultants were

concerned primarily with the professional needs of the medical services in the service commands. In those service commands where the augmented consultation system was introduced, these professional duties required only 75 percent of their time; the remainder was spent at headquarters.

Another appraisal of medical consultants' duties as they evolved with the passage of time is provided by Col. F. Dennette Adams, MC, Consultant in Medicine, Fourth Service Command, from September 1943 to December 1945. Colonel Adams observed in his final report that during the earlier months following the initiation of consultants' service in his command, the consultant's activities were limited almost exclusively to matters pertaining directly to the care of the patient. He was charged with the following duties:

1. To advise the Surgeon, Fourth Service Command, concerning all matters relating to the diagnosis and medical treatment of disease and the professional operation of medical and laboratory services in all service command hospitals.

2. To maintain liaison with the chief consultant in medicine in the Surgeon General's Office on matters of a professional nature and those pertaining to key personnel.

3. To visit all service command hospitals, survey the medical and laboratory services and make recommendations to the chiefs of services and the commanding officer in each installation as well as to the service command surgeon, and prepare a report of each survey for channeling to The Surgeon General.

4. To hold teaching rounds and clinics at installations visited.

5. To serve as consultant for chiefs of medical service within the hospitals of the service command and advise them regarding professional problems.

6. To evaluate professional qualifications of medical officers serving at each installation.

7. To be available to act, on the request of the commanding officer of a hospital, as a consultant on any unusual or complicated case under his jurisdiction. (In some instances, this involved a personal visit to the hospital; in others, the chief of medical service or other qualified officer from a nearby general, regional, or station hospital was designated to act for the consultant.)

As time elapsed, the consultant's duties were broadened to include the following:

1. To survey professional qualifications of officers assigned to the medical and laboratory services in order to recommend proper professional classification and coding.

2. To assist the personnel branch of the service command surgeon's office in the proper assignment of medical officers.

3. To review all cases of death occurring in the service command to detect possible errors in diagnosis or treatment and to make recommendations aimed at preventing similar mistakes in the future.

4. To review, edit, and approve or reject, prior to dispatch to The Surgeon General for final review and action, articles written by medical officers in the command and intended for publication in professional journals.

5. To prepare articles of timely professional interest for publication in the monthly *Medical Bulletin* of the Surgeon, Fourth Service Command.

6. To encourage other officers in the command also to contribute appropriate articles to this bulletin.

The service command consultants were not bureaucrats. Not more than one-third of their time, and usually less, was spent in headquarters. A summary of Colonel Adams' observations on medical consultant activities in the Fourth Service Command gives a detailed, intimate view of how one medical consultant carried out his mission.

In general, the consultant spent 75 percent of his time in the field and the remaining 25 percent at headquarters. Days at headquarters were devoted to administrative work, such as writing reports of his visits, familiarizing himself with current War Department directives, discussing policies with the service command surgeon so as to be qualified to interpret them properly to officers in the field, reviewing papers submitted for publication, and discussing with the Medical Personnel Branch, Headquarters, Fourth Service Command, changes of assignments to bring about better distribution of the more proficient officers and so encourage a higher level of medical care.

The consultant usually spent from 10 to 20 days on each trip to the field, visiting from 3 to 6 installations, depending on their size. Such trips were alternated with periods of from a week to 10 days at headquarters. Until March 1944, Army Air Force hospitals were included in the itinerary. Subsequent to this time, because of changes in War Department policy, an Army medical consultant visited an Air Force hospital only at the commanding officer's specific request that the consultant come for the express purpose of consulting on an individual case or of participating in a clinic or in ward rounds. These requests were not common.

It required from 4 to 6 days to accomplish a mission in a hospital with a large number of medical beds and from 1 to 3 days in a smaller hospital. Usually, rounds were held on every ward on the medical service or on at least one ward of each officer assigned to the service. The chief or assistant chief of service together with the section chief and ward officer concerned were expected to accompany the consultant. Other officers were always invited but never ordered to attend and, in most installations, rarely did so despite the fact that rounds were modeled after similar rounds held in civilian teaching hospitals. However, in a few installations, notably those in which the ward officers were young and appeared eager to learn, attendance was gratifying. Once in a ward, the consultant made it a point to see each patient. Word spread rapidly through every hospital that a consultant from headquarters was making ward visits. Patients who were not given some attention felt neglected, perhaps resentful. Time permitted detailed consideration of only the more difficult or serious problems, but each record was read and the soldier briefly questioned, often encouraged.

In surveying a case, the consultant reviewed the history with great care, noting especially the length of the patient's stay in hospital, the adequacy of

the history, progress notes, and details of treatment. Where indicated, a physical examination was performed. In a friendly way, the ward officer or section chief was questioned concerning his diagnosis and treatment, in an effort to contribute constructive teaching as well as to gauge the officer's ability. Care was taken neither to embarrass any officer by a thoughtless remark nor to weaken the confidence of the patient in his physician. Free discussion without regard to rank of the medical officers participating was encouraged.

An estimate of each officer's ability, industry, and judgment was always recorded in the official report and became the basis of a recommendation pertaining to MOS (military occupational speciality) number and letter designating proficiency in the specialty.

A profitable opportunity for gauging the quality of professional work and judgment was afforded by attendance at meetings of the officers' disposition board, certificate of disability for discharge board, and other boards concerned with the final evaluation and disposition of patients. Here, in addition to estimating judgment and proficiency, the consultant often was able to help with decisions and interpret War Department disposition policies.

It was planned to give at least one talk or clinic to the medical staff or the entire professional staff at each installation visited. In certain hospitals, the consultant was always requested to do so; in others, it was necessary for him to ask the commanding officer or chief of medical service to arrange a meeting. Interesting or problem cases discovered on the wards were presented and discussed, a talk on some timely subject was given, or a clinicopathologic exercise was conducted. In many instances, the officers appeared alert, interested, and anxious to learn; in others, apathy was the keynote; in still others, the staff seemed to regard attendance as just another chore. As would be expected, those medical officers most in need of instruction were the least likely to attend.

The following deficiencies were frequently encountered during surveys of the medical services:

1. Failure of the chief and assistant chief to make proper ward rounds sufficiently often to maintain familiarity with their cases. Sometimes this could be attributed to either lack of drive or lack of self-assurance. More often, however, especially in the larger installations, it was the direct result of the heavy load of administrative work. Where the hospital commanding officer was sympathetically interested in the actual care of the sick soldier and clearly recognized the need for careful clinical supervision by his chief of service, he made every effort to reduce this administrative load. If sufficient personnel were available, he provided the chief of service with one or more able Medical Administrative Corps assistants and capable enlisted personnel. Where the hospital commander placed primary emphasis upon administrative details, the chief of service was overburdened with annoying and time-consuming non-clinical tasks. In fact, it was not uncommon to encounter a commanding officer who habitually, several times a day, called his chief of service to his office to discuss minutiae that could have been covered in a routine daily conference.

In so doing, he interrupted rounds or otherwise hampered professional work. The consultant always made the effort to have Medical Administrative Corps assistants assigned to the chiefs of service and to dissuade commanding officers from calling upon the chiefs for such duties as Saturday inspections, investigations, and membership on administrative boards and councils. Shortage of personnel was the reason most often given by hospital commanders for failure to carry out such recommendations.

2. Failure of ward officers and section chiefs to take adequate histories. When this was encountered, it sometimes reflected lack of interest but more often was due to lack of fundamental medical training and knowledge of symptomatology in relation to disease entities. Often, the history was a record merely of what the patient said; it showed no indication of an attempt to run down symptoms, to follow leads, or to unearth facts that might point toward the correct diagnosis. In urging for better histories, the consultant emphasized not only these points but especially the need for an account of the patient's performance and adjustments in civil and military life. Carefully taken, such performance histories often brought out emotional limitations responsible for the symptoms and were valuable in estimating the patient's suitability for future military duty.

A social history was rarely taken on the medical service. Here was the cause of the backlog of neuropsychiatric consultations encountered in many hospitals. The neuropsychiatric specialist was forced to spend one or more hours taking the emotional and social history on each patient sent for consultation from other services.

3. An excessive number of intersection consultations and the thoroughly established precedent of regarding each specialist's opinion as infallible. Once a so-called clearance had been obtained for any section, the decision was regarded as final. Personal consultations and discussion of cases at the bedside were infrequent. Too much emphasis was placed on written reports.

4. Thoughtless requisitioning of unnecessary laboratory and X-ray studies. A complete blood count was ordered when white count, hemoglobin, and differential count would have been sufficient. Sedimentation rates often were a matter of routine, ordered without consideration of their diagnostic value. Gastric analyses were performed when by no stretch of imagination could they have been helpful. The unnecessary load on the laboratory resulted in hurried work. The same can be said of X-ray examinations, electrocardiograms, and other special procedures.

5. Lack of attention to detail in prescribing treatment and failure to ascertain that treatment was given properly. This applied particularly to feeding problems and to administration of fluids, especially in patients treated with sulfonamides. Often, orders were written sketchily or only given verbally to the nurse. A sense of obligation to follow up and confirm was lacking.

6. Too free use of sulfonamides. Particularly true in the earlier stages of the war, this became less noticeable as education and experience was accumulated. Coryza, mild sore throat, and fever of undetermined cause were treated with sulfonamides without due consideration of the potential dangers and

limitations of these drugs. This was avoided in the case of penicillin by proper instruction prior to its release for general use.

7. Tendency to label as a psychoneurotic any patient in whom routine examination failed to establish the existence of structural disease.

8. Prolonged hospitalization of patients with minor ailments, especially neurocirculatory asthenia, functional gastric disorders, chronic headache of emotional origin, and other like disturbances. Psychoneurotics not only were made worse but many were actually created in hospitals. If promptly and properly handled at the start, a good share of them could have been saved for some useful military purpose.

9. Failure to perform rectal examinations.

10. Failure of the ward officer or his superiors to establish proper rapport with the patient, to encourage a close physician-patient relationship and to exhibit evidence of genuine interest. The most common complaint heard from soldiers was, "They ain't done nothing for me. They ain't told me nothing."

The consultant continually emphasized these deficiencies on his rounds. They became somewhat less noticeable in the later months of his tour of duty.

PERSONNEL MANAGEMENT

In World War II, after medical officers were commissioned, they were assigned to The Surgeon General's pool for redistribution to Army Ground and Service Forces and to the Air Forces as well until the independent procurement program of medical officers for the Air Forces came into being early in the war. The Surgeon General assigned officers (1) to the Army Ground Forces, where they were reassigned by the surgeon of the Ground Forces to mobile medical units and to combat units, or (2) to the Army Service Forces. Personnel were provided directly to those installations under the control of The Surgeon General, such as general hospitals in the Zone of Interior (excluding Walter Reed General Hospital, Washington, D.C., until after April 1943), the Army Medical Museum, the Army Medical Research Laboratories, the Army Medical Service School, and other Class II installations. The service commands were provided personnel for reassignment by the service command to station hospitals and other service command installations such as induction stations, reception centers, redistribution stations, and dispensaries.

The extent to which service command consultants influenced or controlled the management of personnel responsible for the care of the sick was usually a measure of the consultants' effectiveness. The service command surgeons and personnel officers learned quickly that the medical consultants, constantly moving about the command visiting and working with hospital staffs, often for several days at a time, were the best informed officers in the command regarding professional personnel. In most instances, after the assignment of a consultant to a service command, there was no great delay before his counsel and advice were sought in personnel evaluations and assignments. Exceptions were few, conspicuous, and not tolerated in the later months of the war.

A discussion of a service command consultant's view on personnel problems based upon extensive experience and many conferences with fellow consultants was provided by Colonel Bauer. The following paragraphs summarize his observations.

The most difficult problem confronting the consultants upon their arrival in the service commands was that of personnel, so basically important to good medical practice. The personnel needs were never adequately filled, either numerically or professionally. The situation became more acute as the need for well-qualified officers in the various theaters of war increased. Many of the difficulties that did arise could have been avoided had the service command surgeons delegated their authority for personnel assignment to the consultants, once the latter were thoroughly acquainted with the medical officers and the needs of the individual installations. This method of procedure or some modification thereof was finally adopted by most of the service commands. The consultants then sought the most equitable distribution of medical officers on the basis of their qualifications, the total needs of the service commands, and the individual requirements of each hospital. An attempt was made to have the appropriate consultant interview every new medical officer before assignment in the service command, but this was not possible when the consultants were in the field. The consultant's appraisal of the intrinsic qualifications of a medical officer and decision as to the officer's correct MOS number was postponed until after personal contact on ward rounds. Proceeding otherwise resulted in too many injustices.

The reassignment of medical officers, particularly chiefs of service, within the service command was always difficult because of the obstructive tactics employed by many of the commanding officers. Sometimes they opposed the transfer of favorite incompetent officers as much as the transfer of competent specialists. In such instances, it was the duty of the service command surgeon to intercede. Without such support, the consultants were unable to utilize the available personnel properly.

The conception prevailed in some quarters in 1942 that every medical officer was capable of performing any type of professional service. Accordingly, newly assigned consultants often found highly trained specialists serving in assignments for which they were not qualified and men with inadequate training in positions of responsibility. Once correction of such malassignments had been achieved, the transfer of key personnel thereafter was not permitted—or should not have been—without the consent of the consultants. Serious disruptions of medical service would have resulted without this agreement, particularly when the transfer of strong chiefs of service was involved.

It is also important that the consultants be permitted to maintain close liaison with the chief medical consultant in the Surgeon General's Office regarding needs for qualified specialists, whether undersupplied or, possibly, oversupplied. The help received from this source, though necessarily limited, was extremely valuable.

The unequal distribution of medical personnel between Army Service

Forces and Army Air Force hospitals was unfortunate and, while impossible to correct at the time, should not be allowed to occur again. To go from one hospital with 5 medical officers caring for 1,200 medical patients to another in the same area with 15 physicians and a total hospital census rarely exceeding 100 was disturbing. It was equally regrettable that so many well-trained specialists were concentrated in the small Army Air Force hospitals, where there was little need for such talent because well-staffed regional and general hospitals were within easy reach. The service command medical services would have been strengthened materially by these officers, could the officers have been transferred to these services. These specialists could have been replaced with well-trained general practitioners. More regular assignment of officers from numbered medical units, in training but without patients, to nearby service command hospitals would have brought similar, though relatively temporary, benefits.

The type of medical personnel assigned to a hospital governed its professional success, unless it was hampered too greatly by the commanding officer. The presence of an able clinician possessing teaching and administrative abilities as chief of medicine materially influenced the professional development of the officers assigned to the medical service. Initially, many of the chiefs of service, not being of this caliber, had to be replaced.

Professional development was enhanced on those medical services organized along the lines suggested by the Surgeon General's Office; namely, chief of service, assistant chief, chief of section, and ward surgeon. This arrangement permits the delegation of responsibility to a group of individuals each of whom is directly responsible to his immediate superior, and it allows for promotion on the basis of merit. If well organized, the arrangement also affords the chief of service sufficient time to supervise closely the clinical activities of his service. However, many chiefs of service did not function in this manner because of a heavily imposed or self-assumed administrative load. This was remedied in most instances by assigning Medical Administrative Corps officers and Medical Department enlisted men trained in administrative matters.

U.S. Army medical officers represented a cross section of the Nation's medical profession. They varied greatly in their professional competence. Some of them lacked the qualities befitting true physicians, including interest in patients as human beings. In the Zone of Interior, many medical officers were reluctant to work more than 8 or 9 hours a day and desired to be free on Sunday. This lack of sense of duty was all too frequently reflected in their work. It was difficult to understand the willingness of many officers to entrust their more seriously ill patients to the officer of the day. However, some commanding officers and chiefs of service were successful in impressing upon their medical officers that in care for seriously ill patients there can be no such thing as duty hours.

These and other observed deficiencies indicate the need for a short course of basic training at the Army Medical Service School followed by a period of from 3 to 6 months with troops in training before assignment to a hospital.

Without such experiences, medical officers have little conception of the physical and mental requirements of a soldier. With a properly conducted period of indoctrination, medical officers would come to appreciate that their most important duty in the Army is to keep the noneffective rate as low as possible. They would also gain a better understanding of the importance of preventive psychiatry and the psychology of leadership in Army medicine.

It is only fair to point out that many medical officers on duty in hospitals were unable to devote as much time to professional work as they desired because of assignments to bivouac areas, time spent accompanying troop trains and patients, overseeing ward property, and similar activities, with in addition, many administrative duties. These difficulties were gradually overcome in some of the installations by assigning well-qualified Medical Department enlisted men for the duties mentioned, by making Medical Administrative Corps officers responsible for property, and by providing messenger service, adequate secretarial aid, and Dictaphones.

The number of highly trained specialists was decidedly limited as was the number of general internists qualified as chiefs of service or section. As might be expected, the personnel records of educational training and postgraduate medical experience were not sure guides to medical proficiency. For instance, certain medical officers with a wide range of medical knowledge, some of whom had been qualified by an American specialty board, lacked conservative, sound clinical judgment or the necessary qualities of leadership. Conversely, other medical officers with little postgraduate training, who had maintained an active interest in scientific matters during years of general practice, were fully qualified to be chiefs of a medical service at a 250- or 500-bed station hospital. The better internists and specialists, when present, were the backbone of the medical organization and contributed as well to the training of physicians. Physicians of average training and ability formed the largest single group of medical officers. The majority of them made every effort to compensate for their lack in skill and training by diligence and willingness to learn. Much credit is due these officers who carried large clinical loads. There were others who, because of lack of training and ability, could not be trusted with the care of the sick without supervision. A small number of officers entered upon active duty with more rank, or shortly acquired it, than was consistent with their professional ability. They were a constant source of dissatisfaction to the consultants because these officers could not be utilized in positions commensurate with their rank. Though reclassification of such officers was frequently suggested, rarely was it effected.

A shortage of officers was common, particularly in late 1944 and 1945. This shortage could have been alleviated to some extent by greater expedition and efficiency in allocation of the large number of medical officers in Medical Department replacement pools. Some of these officers remained unassigned for months.

Some physicians came into the Army with great enthusiasm and a deep desire to serve, even at a sacrifice. Many others came in under stress of

various kinds and were subsequently poorly prepared for the entirely new life. As time passed, many of them became discouraged or disgruntled because of their inability to adjust satisfactorily to Army life, failure to resolve other personal problems, malassignment, injustices in promotion, the rigidity and lack of understanding of certain hospital commanders, dissatisfaction with efficiency reports, time wasted in orientation courses that were not pertinent to professional activity, continued drilling and physical training after assignment to a hospital, and unnecessarily poor living quarters and mess facilities. The consultants were particularly impressed with the fact that, despite all these difficulties, groups of heterogeneous doctors gathered from the four corners of the United States were assimilated so readily that these doctors could function as coordinated staffs in a remarkably short period of time.

This process of assimilation was most readily accomplished in the Air Force station hospitals because the staffs were smaller and composed of younger men who were approximately the same age and more nearly comparable to one another in their medical education, training, and thinking. The Air Force station hospitals had an additional advantage. The commanding officers were younger and more recently removed from professional work, with the result that most of them were as interested in the professional activities of their hospitals as in administrative matters. A commanding officer with these dual interests frequently made possible a more integrated and efficient institution.

Medical officers assigned to airfield dispensaries and similar posts suffered from the effects of isolation. An active rotation system would have corrected this.

The following paragraphs are a summary of comments on personnel by Col. Johnson McGuire, MC, Consultant in Medicine, Fifth Service Command, from 7 July 1944 to December 1945.

The assignment of medical officer personnel within the Fifth Service Command was made by the service command surgeon through the service command personnel division. In practice, this authority was delegated to the assistant surgeon and constituted a large part of his duties. Until the medical consultant had been on duty for several months, there was relatively little opportunity to discuss assignments to specific hospitals when officers were offered to the Fifth Service Command by the Surgeon General's Office. This lack of discussion was due in part to the frequent visits of the medical consultant to the field and in part to the remarkable knowledge of the assistant surgeon of personnel problems in each hospital. The assistant surgeon therefore thought it unnecessary to discuss assignments with the medical consultant.

After approximately 4 months, the assistant surgeon consulted with the medical consultant before making assignments of medical officers to key positions, and, by this time, the medical consultant was sufficiently familiar with the problems in each hospital to make specific recommendations, which were usually accepted.

With the permission of the Surgeon, Fifth Service Command, the medical consultant kept the Chief Consultant in Medicine, OTSG, constantly informed of the needs for replacement of key personnel within the Fifth Service Command. Such information was transmitted informally by personal letter. The cooperation of the chief consultant's office was outstanding, and, within relatively short periods of time, replacements were made available.

The chiefs of service of the general hospitals of the Fifth Service Command had an MOS of A- or B-3139 without exception, and, during the period covered by this history, these officers were uniformly capable and efficient. Outstanding assistant chiefs of service were disappointingly few in number and difficult to obtain. Section chiefs, as would be anticipated, varied from superior to mediocre clinicians. The latter were replaced when better officers were made available.

Ward officers were, in many instances, mediocre. Most of the young and healthy officers had been assigned overseas, leaving only middle-aged general practitioners with relatively little postgraduate training in internal medicine for assignment as ward officers in the Zone of Interior.

The effect of the size of the service command and of the attitude of the surgeon toward his own role and toward that of his consultant on the type of personnel program which could be successful in a service command, as well as certain points of view of the consultant, were discussed in the report of Col. Alexander Marble, MC, who, after long service in the Pacific, was assigned as Consultant in Medicine, Sixth Service Command, from March 1945 to September 1945 and as Consultant in Medicine, Eighth Service Command, from September 1945 to December 1945. Colonel Marble reported, in essence, as follows:

The matter of personnel was handled differently in the Sixth and in the Eighth Service Commands. In the Sixth Service Command, rather than having a group of officers whose sole duty was attending to matters of personnel, the service command surgeon acted largely as his own personnel officer, seeking the suggestions and advice of the consultants when indicated. His decisions were carried out through an officer of the general staff personnel division of headquarters. The latter had his office on another floor of the building and so was not an intimate part of the office force of the surgeon.

The Surgeon, Sixth Service Command, had requested that, when medical officers were assigned to the Sixth Service Command, they not be sent directly to specific hospitals but that they first report to service command headquarters. Thus, the service command surgeon together with the appropriate consultant had an opportunity to see and talk with the man, thereby making possible a better decision as to an appropriate assignment. It is possible that in a large service command this plan would not be feasible, but it worked very well in the smaller Sixth. Of course, those few officers who were sent by the Surgeon General's Office for definite assignments were given them, but, even in the case of these men, it was an advantage to have an opportunity to meet and talk with them before they reported to their duty stations.

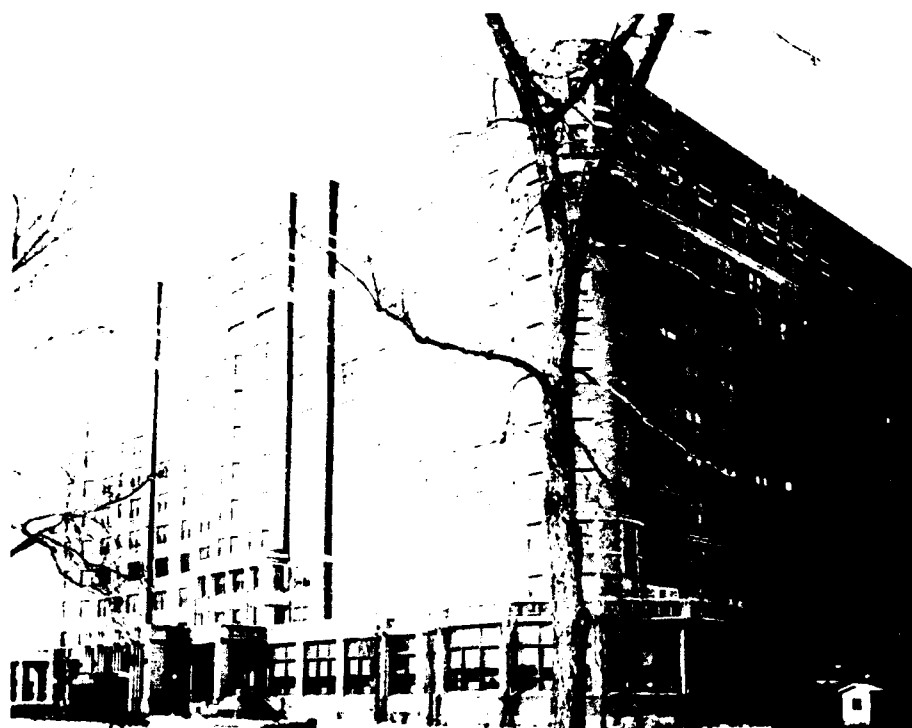


FIGURE 29. Gardiner General Hospital, Chicago, Ill., one of the major medical installations in the Sixth Service Command.

Throughout this consultant's service in the Sixth Service Command, there was a more or less constant plea by almost every installation for more personnel of every type (fig. 29). The lack of trained personnel was at times very real in some installations, but, by and large, there was an adequate number of officers to do the work. It is fair to say that most medical officers did not work any harder at their assignments in the Army than they had been accustomed to working in civilian practice. There were a few notable exceptions in certain specialties; for example, the pathologists in the larger hospitals were often overworked and badly in need of trained assistants, who could not be obtained because of the small number available. Some pathologists worked week after week until midnight in order to keep current with their work.

Shifting of medical officers from one installation to another was not done thoughtlessly or carelessly. Due consideration was given to the effect of the transfer not only on the installation concerned but upon the officer and his family. At times, however, military necessity outweighed all other considerations.

CLINICAL PROBLEMS

This is not the place for a detailed discussion of the clinical aspects of the diseases encountered, but, from material available in reports from several of the consultants, a general picture can be drawn of the clinical problems that engaged the interest of these consultants during their tours of duty.

Colonel Adams provides a broad view of the trends of disease as he observed them in the Fourth Service Command during the training period and, later, when patients invalided home from overseas began to arrive. Colonel Adams reported generally as follows.

During 1942, 1943, and the early part of 1944, when training activities were at their height, hospital admissions for disease were largely due to (1) upper respiratory infections; (2) pneumonia, especially atypical pneumonia; (3) meningococcal infection; (4) diarrheal diseases occurring in epidemics; (5) dermatologic disorders, especially dermatophytosis and other eruptions on the feet; (6) venereal disease; (7) asthma and other allergic disturbances; and (8) ill-defined symptoms for which no organic causes could be found and which were usually thought to be psychoneurotic. The last group included a large number of individuals designated "inadequate."

Acute upper respiratory diseases and the run of contagious diseases posed no particular problem, except for loss of time from training. The sulfonamides were prescribed much too freely in the upper respiratory cases, but, as medical officers became increasingly aware of the indications for and against their use, this practice diminished.

Meningococcal infection first appeared in this command in epidemic form in December 1942 and for several months created a serious situation. The first epidemic began at Camp Sibert, Ala., in late December 1942; at about the same time, cases began to be reported from other camps. Immediately, a letter was sent by the service command surgeon to all post surgeons, inviting their attention to the need for watching closely for outbreaks of the disease, describing the signs and symptoms (especially the earliest), and outlining a plan of treatment. The medical consultant on his visits to each camp gave talks on this disease. This educational program is believed to have led to early diagnosis and more prompt and vigorous treatment, which may have contributed to a lower mortality rate. The following figures for this command were compiled: For December 1942 and January 1943, 317 cases with a mortality rate of 8.8 percent; and for February and March 1943, 761 cases with a mortality rate of 2.1 percent.³

Cases of atypical pneumonia also appeared in large numbers. Here again, an educational campaign was waged. Little was understood about this disease. Most medical officers were not familiar with its manifestations. The officers were instructed regarding the clinical picture. Especially emphasized was the fact that the disease could exist in a severe form without physical signs, the diagnosis depending chiefly upon chest roentgenograms. As experience was gained, officers on the respiratory wards, especially in large station hospitals, became extremely proficient in recognizing this disease. At first, sulfonamides were too freely administered; the educational campaign reduced their unwise use.

³ Thomas, H. M., Jr.: Meningococcal Meningitis and Septicemia; Report of Outbreak in Fourth Service Command During Winter and Spring of 1942-1943. *J.A.M.A.* 123: 264-272, 2 Oct. 1943.

Explosive outbreaks of diarrhea occurred in several organizations, usually those on bivouac, especially during the early periods of training. Investigation revealed that these epidemics most often were due to lack of recognition by line commanders of the necessity for rigid field sanitation. As officers and troops became more experienced, important outbreaks ceased.

An allergy program, sponsored by Col. Sanford W. French, MC, Surgeon, Fourth Service Command, was well conceived and managed (fig. 30). Patients in the command suffering from any allergic disturbances received the best possible diagnostic and therapeutic care. However, if a soldier was transferred to another command or overseas, uniformity of therapy could not be guaranteed. Hence, the impracticability of Armywide application of the procedures standardized in this command limited the overall value of the program. Few soldiers with allergic disturbances were restored to full (general service) military duty, but many were enabled to render useful (limited) service when assigned to fixed installations.

Admissions to general hospitals during the first 2 years in large part consisted of difficult diagnostic problems and cases requiring long-term care or serious operative procedures. In June 1944, the large station hospitals were designated regional hospitals and were charged, in addition to previous assignments, with the care of such Zone of Interior patients as formerly would have been transferred to general hospitals. (This was done in order to free beds for the reception in the named general hospitals of patients from overseas.) Thus, it became necessary to strengthen promptly the staffs of regional hospitals. This augmentation was rarely satisfactorily accomplished because of the shortage of specialists.

Although designated for Zone of Interior patients, the regional hospitals also received a fairly large quota of patients with diseases that had been acquired overseas. These soldiers were in the United States as a result of rotation or, having been returned as patients, had been discharged from general hospitals to duty in this country. Malaria, amebiasis, allergic states, peptic ulcer, residuals of hepatitis, intractable dermatologic diseases, and psychosomatic disturbances were most commonly encountered in this group.

As the load of patients from overseas increased, the following categories of illnesses were predominant in the general hospital medical wards: (1) Recurrent malaria; (2) acute or chronic hepatitis; (3) peptic ulcer; (4) allergic disorders, especially bronchial asthma; (5) trenchfoot; (6) amebiasis; (7) rheumatic fever, rheumatoid arthritis, and other forms of musculoskeletal disease; (8) psychosomatic complaints in soldiers who had been screened improperly and sent to medical services of hospitals in the Zone of Interior instead of to neuropsychiatric centers or convalescent hospitals; (9) skin diseases, especially atypical lichen planus and dermatitis in patients from the Pacific areas; and (10) various tropical disease, especially filariasis and schistosomiasis (Moore General Hospital, Swannanoa, N.C., only).

The peptic ulcer cases were often difficult. Many soldiers were encountered in whom this diagnosis had been established in theaters of operations.



FIGURE 30.—Allergy program, Fourth Service Command. A. Allergy clinic, Station Hospital, Fort McPherson, Ga., October 1942. B. and C. Preparing allergen solutions for diagnosis and desensitization, Fourth Service Command Medical Laboratory, Fort McPherson, Ga., October 1942.

On the soldiers' return to this country, perhaps because of relief from combat tension and treatment in overseas hospitals, they exhibited no clinical or roentgenologic evidence of ulcer. Most of them had mild gastric complaints, but it was impossible to determine how many of these complaints were the result of an unconscious desire to be relieved from military duty and how many the result of persistence of the disease. Chiefs of gastrointestinal sections had difficulty in deciding whether the patients actually ever had peptic ulcers and in evaluating their patients' current condition. Early in the war, many of these patients were sent to limited duty, but it soon was learned that they would not do well.

The proper disposition of general hospital patients returned to the Zone of Interior from overseas presented a difficult problem. In the early stages, the emphasis was placed upon returning these patients to duty. However, it is doubtful if many were able to contribute effective service except when a real desire to remain in the Army existed. Later, there appeared a growing tendency to discharge overseas patients from the service.

The following is a partial list of cases of unusual interest reported from the stations noted:

Cases	Station
Sarcoidosis.....	Batley General Hospital, Rome, Ga.; Regional Hospital, Fort Benning, Ga.; Regional Hospital, Fort McClellan, Ala.; and others.
Histoplasmosis.....	Foster General Hospital, Jackson, Miss.; Regional Hospital, Fort Benning, Ga.; Regional Hospital, Fort Jackson, S.C.
Spontaneous rupture of spleen.....	Foster General Hospital, Jackson, Miss. (during malaria therapy for neurosyphilis); and Regional Hospital, Fort Benning, Ga. (during attack of mononucleosis).
Leprosy.....	Stark General Hospital, Charleston, S.C.; and Regional Hospital, Camp Blanding, Fla.
Actinomycosis.....	Several hospitals.
Coccidioidomycosis.....	Do.
Amebic abscess of liver.....	Do.
Endemic typhus fever.....	Several hospitals, chiefly in Southern Georgia and Alabama.
Tularemia.....	50 cases at Station Hospital, Camp Forrest, Tenn., during Tennessee maneuvers in 1942-43 (fig. 31); from hospitals in Mississippi and elsewhere.
<i>Bacteroides funduliformis</i> infection....	Regional Hospital, Fort Benning, Ga.
Coarctation of aorta.....	Do.
Heat stroke.....	Several hospitals, especially in southern training camps.
<i>Ancylostoma brazilense</i> (creeping eruption).....	Regional Hospital, Camp Blanding, Fla.; Station Hospital, Camp Rucker, Ala.; and southern camps.
Poliomyelitis.....	Sharp outbreak of 17 cases with 3 deaths, in March and April 1945, Regional Hospital, Fort McClellan, Ala.



FIGURE 31. Patient brought to admission tent of 68th Medical Regiment at Nashville during Second U.S. Army Tennessee maneuvers, 16 October 1942.

Col. Henry M. Thomas, Jr., MC, Consultant in Medicine, Fourth Service Command, from August 1942 to August 1943, reported on clinical problems in military hospitals in 1942. His views are of special interest in relation to later developments in dermatology, venereal diseases, and neuropsychiatry. He commented, in general, as follows:

1. *Dermatology:* Dermatology should be a separate service; separate, that is, from venereal diseases, with which it was so often combined. There was a surprising dearth of well-trained dermatologists. In retrospect, it seems it would have been worthwhile to collect a few superior dermatologists and send them around to the various hospitals as instructors. Perhaps, schools of dermatology could have been established, but Army dermatology is rather stereotyped and does not cover a very wide field. A basic dermatologic training given to all officers on medical services would be valuable, particularly in tropical areas. The medical consultant always visited the dermatologic cases; however, he contributed nothing but encouragement and interest.

2. *Venereal diseases:* In some hospitals, syphilis and dermatology were treated on the medical service and gonorrhea on the surgical service; in others, syphilis and gonorrhea were both treated on the surgical service; and, in still other hospitals, syphilis and gonorrhea were both treated on the medical service. It is a matter of some importance that the responsibility for therapy should be uniform. In this consultant's opinion, syphilis is entirely a medical disease,

and gonorrhea is a medical disease with a very rare surgical complication. It is true that a certain number of genitourinary surgeons specialize in the treatment of gonorrhea, while it is difficult to find any officers on the medical services who have had experience with treatment of gonorrhea. Furthermore, chiefs of medical services take very little interest in gonorrhea cases. These officers have learned about the disease in this war, and, from now on, gonorrhea will become a medical disease.

3. *Neuropsychiatry*.— One of the most generally neglected phases of therapeutics in the leading medical schools of the country is so-called psychosomatic medicine. The Oslerian school treated these cases with a characteristic wave of the hand and pat on the back, went to the next patient with a heart murmur, and from there went to the pathology laboratory. The usual teacher of clinical medicine finds it difficult to crowd into the small number of hours the amount of learning essential to the fundamentals of diagnosis. When it comes to the time-consuming and somewhat subtle exposition of the patient as a whole and the part the psyche plays in symptomatology, the clinical teacher often feels himself at a disadvantage and avoids undertaking a complicated role. It was the medical consultant's experience that, by and large, the ward officers in the station hospitals in the Fourth Service Command had very little conception of the patients' worries and the psychologic aspects of the patients' treatment. This consultant, early in his Army experience, became interested in the functional aspects of duodenal ulcer cases and referred to this subject in discussions of the wider field of psychosomatic symptomatology.⁴ This, however, cannot be taught by Army consultants alone and actually is the responsibility of the medical school curriculum. In the Army, the consideration of the patient as a whole involves the morale of the patient as a soldier.

The greatest help was obtained from Lt. Col. (later Brig. Gen.) William C. Menninger, MC, Consultant in Neuropsychiatry, Fourth Service Command, who frequently made rounds on the medical ward and discussed the many borderline psychiatric cases that abounded in all wards. A large percentage of medical patients have such problems, and the responsibility rests clearly on the chief and other members of the medical service. The neuropsychiatric consultant cannot see every patient, but he can function through the medical officers. During this war, the Medical Department went a long way in combining activities of the neuropsychiatric and medical services. The medical consultant was extremely interested in occupational therapy, both on the ward and in the workshop (fig. 32). Since there was no occupational therapy in most of the station hospitals, it became necessary to try to get the American Red Cross to provide this valuable service (fig. 33). Later, on visits with the neuropsychiatric consultant, it became a contest as to which consultant would get the most cooperation from the Red Cross department. Actually, the neuropsychiatric consultant could have kept two Red Cross departments busy at each hospital.

⁴ Thomas, H. M., Jr.: Peptic Ulcer in the Army. *South. M. J.* 36: 287-291, April 1943.



FIGURE 32.—Occupational therapy at Madigan General Hospital, Tacoma, Wash. A. In wards. B. Workshop scene.



FIGURE 33. —American Red Cross arts and crafts program, Station Hospital, Fort Hayes, Ohio, March 1944.

Colonel Bauer, in a report on the weakness of the educational and training program of physicians in relation to Army psychiatry, the importance of proper psychiatric management in Army hospitals, and urgent problems concerning the proper and prompt disposition of patients, made the following observations.

Neuropsychiatry remained under medicine in most of the Army hospitals, although a few of the consultants favored its being a separate service. Experience demonstrated that neither scheme necessarily provided successful management of medical patients with psychoneurotic and psychosomatic disorders. More important than operational arrangements are physicians who, because of their attitudes, skills, and mutual respect for one another's disciplines, are capable of functioning as members of a highly cooperative and coordinated team. Unfortunately, there were very few such diagnostic and therapeutic groups. If they had been more numerous, there would have been less disagreement concerning the location of patients, the physician responsible for therapy, and the relation of neuropsychiatry to medicine.

Never has the need for physicians to recognize and manage psychoneurotic and psychosomatic complaints and disorders been more clearly demonstrated. It reflects the greatest deficiency in American medical education in recent years and also emphasizes the evils of specialization. Evidently, the effort to train physicians to recognize and treat physiologic and organic disorders

has resulted in failure to stress the importance of personality functioning and psychopathology.

The defects of such medical training were readily apparent in the service command hospitals. Too many patients were admitted; too much was done to them; they stayed too long; they were subjected to much indecision and received little or no psychotherapy, and their disabilities were either prolonged or increased. Under such conditions, the number of individuals salvaged for soldiering was disappointingly small. In many cases, treatment at the dispensary or outpatient level would have been more successful.

These patients were essentially the same as their brothers in civilian life. The approach to them should have varied little. Carefully taken histories usually revealed the basic nature of the disorders. Well-trained medical officers who could handle their own anxiety and demonstrate friendliness, sympathy, and warmth to the soldiers as well as sincere desire to help had little difficulty in determining the patient's personality makeup, past performance, and relation to symptom formation. The failure of medical officers to function in this manner led to such labeling as "gold-brick," which resulted in increasing, unrelieved emotional tension and the precipitation of neuroticisms and psychosomatic complaints.

A prolonged period of observation and study of neurotic patients is not only wasteful of time and money but is also harmful to the patient, since the persistent effort of the physician to find an organic cause and failure to do so tends to aggravate the patient's belief that he has an obscure malady. Furthermore, the inexperienced physician, overimpressed by a minor deviation from normal in some physical finding or laboratory test, adds to the patient's anxiety. Reliance on this method of procedure—diagnosis on the basis of exclusion—should be discouraged if not prohibited.

Some of the difficulties that arose were attributable to administrative uncertainty and indecision as to the proper disposition of these patients. Under the pressure of an increasing manpower shortage, the administrative position changed from one of excluding them from the Army to one of retaining all but the most severe cases. With this change, however, there was no adequate system for assigning patients to suitable types of duties. During 1943, thousands of useful soldiers were discharged from the Army to their own detriment as well as to that of the service. As the regulations governing these discharges were tightened, the hospitals faced other difficulties. When these men were returned to duty, they found scant welcome in their organizations. The unit commanders found it easier to return the men to the hospitals than to find a place for them in the original unit or to follow the procedure necessary to have the men properly assigned elsewhere. Consequently, they were returned to the hospitals again and again by their commanders in an effort to get rid of these soldiers. This practice not only added greatly to the burden of the hospitals but also confused the medical officers and reacted disastrously on the soldiers. In no other instance in the Medical Department of the Army was there greater need for formulation and execution of a policy than in the

management and disposition of soldiers with psychoneurotic and psychosomatic complaints.

LABORATORY ACTIVITIES

The Laboratory Division, Preventive Medicine Service, OTSG, exercised supervision over medical laboratories in the Army. In the United States, elaborate service command laboratories supported those of the general and station hospitals, and the dispensaries. Laboratory personnel, equipment, and supply were administered separately from the clinical services of hospitals in spite of the fact that the laboratories operated in hospitals almost exclusively in support of the clinical services. Of course, important laboratory work was done for preventive medicine and public health, especially in the service command laboratories.

In the best hospitals, there was the closest liaison between the medical service, the laboratory service, and the consultants in medicine. Wise clinicians and wise clinical pathologists saw to this. The interest and support of the professional consultants was important to the proper functioning of the hospital laboratories, since otherwise, in the opinion of many observers, they had limited supervision and advice from other sources. In many, if not most instances, the clinical laboratories would have functioned in professional vacuums had it not been for the consultants in medicine and the chiefs of medical services and sections.

A critical appraisal of the utilization and operation of the laboratory facilities in a large service command was provided in Colonel Bauer's report. His views are summarized in the following paragraphs.

A satisfactory laboratory service requires a director capable of coordinating its activities with those of the clinical services. It also requires properly trained personnel, suitable space, adequate equipment, and a workload adjusted to the size and ability of the laboratory staff. Directors who were competent pathologists and interested in clinical pathology and teaching contributed greatly to the intellectual atmosphere of hospitals. When such men were flanked by competent Sanitary Corps officers trained in biochemistry, immunology, and bacteriology, the clinicians were assured that the laboratory work would be carefully supervised and well executed. Unfortunately, such laboratory services were all too rare.

The hospital laboratories were sufficiently well equipped eventually to perform practically all the examinations which are done in the better civilian hospitals. The maintenance of adequate technical staffs, however, was always difficult because the enlisted men were poorly trained and rapidly transferred. The resulting vacancies were of necessity filled by civilian technicians who were inadequately trained. Generally speaking, the bacteriology and immunology sections were the weakest.

The abuses of laboratory services attributable to the clinicians were many and resulted in countless numbers of unnecessary determinations, which further impaired the efficiency of the work. This misuse of laboratories, common

in civilian as well as military hospitals, was undoubtedly accentuated in the Army by the absence of the cost factor. Clinicians without firsthand knowledge of laboratory procedures were most frequently responsible for excessive requisitioning of laboratory studies. In some hospitals, the additive effect of all these factors was great enough almost to nullify the laboratory's contribution to diagnosis and treatment.

The consultants continuously impressed upon the medical officers the rational use of laboratory procedures as diagnostic aids and therapeutic guides. The consultants also urged the chief of the laboratory to meet with the chiefs of medicine and surgery immediately following the completion of each monthly report, in order to promote full discussion of matters pertaining to the efficient functioning of the laboratory. Supervision of the laboratories by the medical consultants was reasonably satisfactory when they had experience in such matters and could allot the necessary time. The assignment of an additional consultant in medicine, with suitable training, would have strengthened this objective of the consultant system, particularly in the larger service commands.

In some hospitals, the laboratory was established as a separate service. This had the advantage of placing the director on an equal footing with the other chiefs of service and enabling him to perform his duties more easily and satisfactorily.

The service command histopathology service, the Army Medical Center, and the Army Medical Museum discharged their responsibilities extremely well, considering the many duties these installations were called upon to perform. The work done by some of the service command laboratories did not justify their large staffs and annual expenses. Many of the directors failed in the particularly important duty of maintaining helpful contact with the staffs of the hospital laboratories. The function of the service command laboratories should be reexamined and redefined. They should be required to submit test specimens periodically to all service command hospitals. This arrangement would provide an additional check on the quality of laboratory work.

Colonel Thomas, the first service command medical consultant to go on duty, reported on observations in the Fourth Service Command. The following paragraphs summarize his comments.

There should be a laboratory consultant in each service command and theater. He would be one of those rarest of all medical officers, an excellent clinical laboratory man. By and large, the laboratory service was the worst in the hospital. There were not enough good, general, clinical laboratory men to go around nor nearly enough technicians. Later, this shortage was partially filled by Army schools for technicians (fig. 34), but this deficiency still reached into the theaters of operations, where it was even more noticeable.

When the medical consultant to the Fourth Service Command found a laboratory problem, he, with the chief of the medical service and the ward officer involved, would go directly to the laboratory service. There a

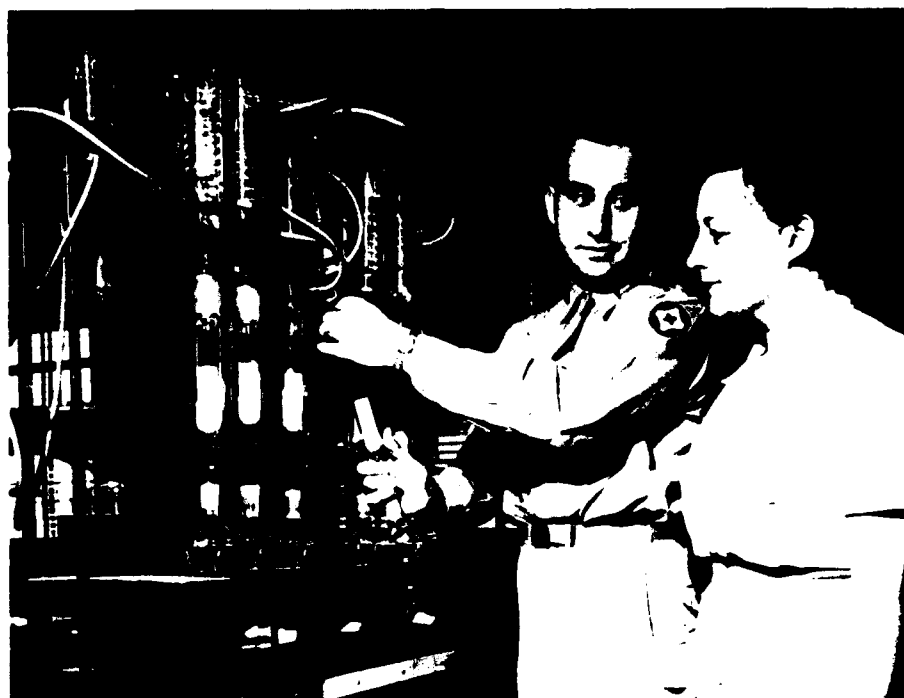


FIGURE 34. Training volunteer as laboratory technician. Fourth Service Command Laboratory, Fort McPherson, Ga., 1944.

discussion would be undertaken on the indications for laboratory examinations, the results, the techniques, and other pertinent information. It was a very rare thing to find a medical ward officer who went directly to the laboratory with his problems. On the other hand, the laboratory almost always sent a rather poorly trained technician to the ward to handle specimens. The result was that many tests were unreliable, specimens were mishandled, and there was no close cooperation between the clinical laboratory and the ward. This problem was taken up regularly in each of the hospitals with the chief of the medical service, the chief of the laboratory service, and with the two of them together.

It was discovered early in visits to hospitals that a great deal of useless routine laboratory work was being ordered for and performed by laboratories that were often already overloaded. For instance, at Fort Jackson, S.C., it was found that some 300 complete blood counts were being requested on peak days. When this was brought to the attention of the surgeon of the service command, an order was immediately circulated forbidding routine laboratory work and directing that each test would be ordered according to its own merit. Surprisingly enough, this seemingly simple directive caused confusion and was interpreted by some medical officers to mean that no case should be thoroughly studied.

The Fourth Service Command Laboratory, Fort McPherson, Ga., was a splendid service command laboratory (fig. 35). It was the habit of the



FIGURE 35. Section of Fourth Service Command Laboratory, Fort McPherson, Ga., February 1943.

medical consultant to send an account of the laboratory service at the various hospitals he had visited to the commanding officer of this laboratory. This service command laboratory sent test specimens to the various hospital laboratories for analysis. In this way, the reliability and accuracy of a laboratory in question could be checked. The local laboratories sent in specimens they had analyzed to be checked in the central laboratory. In addition, the service command laboratory gave refresher courses for technicians and for laboratory officers. This was very satisfactory. However, in addition to this, the need for a laboratory consultant was clearly evident. An assistant medical consultant should be appointed with duties confined to clinical laboratory work. This laboratory consultant should function in the professional consultants section in the office of the service command surgeon.

AUTOPSY PROTOCOLS

It became an important function of service command medical consultants to review autopsy protocols in medical cases originating in the service command. This was a direct outgrowth of experience with the procedure in the Eighth Service Command, concerning which Colonel Bauer commented substantially as follows.

Beginning with the first hospital visited, the Eighth Service Command consultant reviewed copies of all autopsy protocols on file. The information gained was so pertinent to good medical care that the Surgeon, Eighth Service

Command, soon issued a directive requesting that all autopsy protocols be forwarded to service command headquarters for review by the appropriate consultant. On the advice of Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General, this procedure was later adopted by the other service commands.

Each of these autopsy protocols included a complete abstract of the clinical findings, clinical course, final clinical diagnosis, gross and microscopic pathologic descriptions, final pathologic diagnosis, and a paragraph summarizing the sequence of events that were thought to have led to death. Three mimeographed copies were forwarded to the service command headquarters, two for filing and one for review by the consultant. Others were distributed to the medical officers of the hospital, preferably at a clinical conference following receipt of the consultant's comments. The quality of the protocols, which varied greatly, furnished information regarding the ability, energy, and integrity of both pathologist and clinician. It was the consultant's duty to forward written comments pertaining to errors of omission and commission as well as to commend excellency of performance. This procedure proved extremely valuable to the consultant as well as to the hospital staff and served as a further check on the quality of care being rendered. It also had anticipatory value in that it was generally understood that the clinical record of any seriously ill patient might eventually be scrutinized in the surgeon's office. The most serious and frequent diagnostic and therapeutic errors disclosed by the protocols were often discussed by the consultants at subsequent visits.

POSTGRADUATE EDUCATIONAL AND TRAINING PROGRAMS

From the outset, those responsible for the initiation and development of the consultant system believed that an active professional educational program would be the best stimulant to high standards of medical practice in the Army. The following is a general description of the medical education programs provided the Sixth and Ninth Service Commands under the direction of Col. Irving S. Wright, MC, medical consultant to each of these commands at different times.

It appeared early to the medical consultant that continued medical education and training were vital to the maintenance of superior medical care, especially if the war was to be a long one. There were many methods, most of which were tried by the consultant in either the Sixth or Ninth Service Commands. They were not equally successful and some that were successful in one hospital failed in another. The following techniques were utilized:

Ward rounds by the consultant. Visits to wards by the consultant appeared to be a very useful form of medical education and training. It was the consultant's policy in hospital visits to spend between 80 and 90 percent of his time on the wards examining patients with members of the staff.

The objective usually was not only the solution of the problem of a particular patient but also the use of that patient's problem as a stimulus for consideration of both scientific and administrative principles.

Field trips.—Visits to the field installations, made with civilian consultants in medicine who were outstanding teachers, were also beneficial to all concerned. These visits probably constituted the highest form of medical teaching and were popular with and greatly appreciated by the hospital staffs.

Unfortunately, the number of medical officers benefited during any one trip with a civilian consultant was small. Nevertheless, the employment of the civilian consultants in this fashion was important, for it introduced new attitudes and fresh points of view from medical schools and civilian hospitals.

Wartime graduate medical meetings.—The principle of wartime graduate medical meetings was sound. There existed factors that militated against success in some of the service commands. Certain requisites were essential, as follows:

1. A consultant who believed in the program and was willing to work for it.
2. One or more civilians who believed in the program and who were dynamic and self-sacrificing enough to activate it on the civilian side.
3. A sufficient number of medical schools or outstanding hospitals to provide men of high professional caliber to act as speakers for the programs. For example, the small Sixth Service Command with its many medical schools and hospitals was an ideal command for this type of teaching, whereas the Pacific Northwest in the Ninth Service Command never achieved a satisfactory program.

After some experimentation in areas where the program was feasible, one meeting every 2 to 4 weeks was arranged. The speakers arrived in adequate time to permit bedside teaching through ward rounds and consultations. Papers for the formal program were usually brief, and an opportunity was provided for discussion and questions from the floor. The wartime graduate medical meetings in the Sixth Service Command were available to all of the personnel in the service command hospitals once or twice each month.

Conferences of chiefs of services.—It was helpful for the chiefs of the medical services of service command hospitals to come together at regular intervals for the exchange of ideas and experiences and for the consideration of recent advances in the fields of medicine that were of practical importance. This type of meeting was not sufficiently used. Some service commands managed to achieve one conference during the entire war. Such a conference should be held at least once a year. The program of a conference in the Ninth Service Command is included in this volume as appendix D (p. 841).

Clinicopathologic conferences.—Material for clinicopathologic conferences was made available through the courtesy of the Massachusetts General Hospital at Boston, Mass., and the New York Postgraduate Medical School of Columbia University, New York City. Arrangements were made in the Sixth and Ninth Service Commands for the protocols to arrive at regular intervals at each large hospital.

The success of such conferences depends upon certain factors. The chief of the laboratory service must be a competent pathologist who enjoys teaching and understands the technique for presenting the material. Since it was noticeable that in hospitals where the staff was predominantly surgical the conferences were not very popular, it would seem that members of the medical services appreciate this type of teaching to a greater degree.

Probably the most important type of pathologic conference is the autopsy. Unfortunately, attendance was not required in some hospitals, although this consultant consistently recommended that it be made mandatory.

Temporary duty assignments for training.—A very important means of comparing experiences and gathering information was the detailing of certain officers to temporary duty in other hospitals where they could learn certain techniques or observe special procedures. For example, when the consultant found that the use of the classification of rheumatic fever was quite different in two of the rheumatic fever centers—namely, Torney General Hospital, Palm Springs, Calif., and Birmingham General Hospital, Van Nuys, Calif. he arranged for the chief of the medical service at Birmingham to visit Torney and later for the chief of the medical service at Torney to visit Birmingham. They studied patients and went over charts together and were able to resolve differences in the use of the classification.

Editorial duties.—The consultant reviewed many papers prepared by medical officers. This was a pleasant task, which seemed worthwhile and especially helpful to young, inexperienced authors. Numerous papers severely criticized in their original form either have reappeared later, much better because of further thought and revision, or have been included in the authors' souvenirs of war experiences where they rightfully belong.

In summary, then although there would probably be some obstacles to continued medical education and many nonreceptive medical officers, such education is unquestionably fundamental to the maintenance of proper medical thought and practice in any hospital system during times of peace or war. The programs described in these paragraphs were not entirely successful in every detail in the two service commands considered in this report, but they did appear to have been helpful to the majority of officers on the medical services of hospitals in these commands.

The postgraduate educational program developed in the Eighth Service Command was most carefully planned and executed. A summary of Colonel Bauer's report follows.

It is generally conceded that the strength of any institution for the care of the sick is directly related to educational facilities which exist therein. However, it was not until the establishment of the consultant system that the educational possibilities of Army hospitals received proper emphasis.

The consultants soon recognized that fostering a strong educational program was the best method of improving the medical services. They further agreed that bringing to the hospital a system of postgraduate education would benefit the largest number of medical officers.

The consultants' ward rounds and clinics served as educational exercises and stimulated better professional performance. However, as visits were too infrequent to have the desired continuing effect, the chiefs of service were urged to establish strong educational programs. These usually included weekly medical staff meetings, clinicopathologic conferences, clinical X-ray conferences, and biweekly hospital staff meetings. In addition, some of the medical services established journal clubs for reviewing the current medical literature. The smaller station hospitals conducted educational programs on a smaller scale.

The staff meetings were often the basic educational activity. Generally speaking, they were well conducted. The cases selected for presentation were well chosen and the available pertinent literature thoroughly reviewed. A few of the abler and more energetic chiefs of service preferred ward conferences from 2 to 3 times a week, attended by the entire medical staffs. These exercises, if properly conducted, encouraged free discussion, furthered professional thought, and served to unify diagnostic and therapeutic procedures.

The clinical X-ray conferences were very successful when well conducted, as evidenced by the large weekly audiences. When the participation by both the clinician and the radiologist was active, such conferences were extremely informative and contributed greatly to the intellectual atmosphere of the hospital.

The general hospital staff meetings varied greatly both in quality and purpose. In many of the installations, the major services—surgery, medicine, neuropsychiatry, and radiology—were responsible for one meeting each month. These meetings were usually devoted to a formal presentation of some topic of general interest. In some hospitals, the meetings were held only rarely or not at all because of the lack of cooperation between the medical and surgical services. This was most unfortunate because such meetings, if well organized, aided materially in unifying the purpose of the hospital staff.

The other educational opportunities afforded medical officers were the wartime graduate medical meetings sponsored by the American College of Physicians, service command conferences for chiefs of service and their staffs, special postgraduate and refresher courses in civilian and Army hospitals, temporary duty assignments, and an intern program.

The first of these was very successful in several of the smaller service commands having many medical schools and energetic, enthusiastic regional chairmen; for example, the Sixth Service Command. Lack of success in other service commands was attributable to failure to have the regional area correspond geographically with that of the service command, the long distance between the Army hospitals and the medical centers, the lack of dynamic, self-sacrificing regional chairmen, and the absence of sufficient medical schools and outstanding hospitals to provide properly qualified teachers. Effective wartime graduate medical meetings required the utmost cooperation between the regional chairman and the service command surgeon and his consultant. Without this cooperation, the meetings were not sufficiently well integrated to meet the needs.

A model program should furnish one or more civilian consultants to each service command hospital at least once a month. The participants should remain for at least 1 day, spending the greater part of their time on the wards with the medical officers. If talks are permitted, they should be confined to appropriate topics and be sufficiently brief to allow ample time for discussion and questions from the floor. The aim of these wartime graduate medical meetings was sound.

During the first 2 years of the war, many medical officers were sent to various specialized schools operated either by the Army or for the Army in civilian hospitals and medical schools. The benefits derived from these courses depended upon the individuals assigned, their ability, diligence, and interest in the subject. Too often, poorly qualified and indifferent officers were indiscriminately ordered to these schools in order to fill the required quota. Therefore, in many cases, neither the individual nor the Army profited from the experience.

The refresher courses held at some of the service command hospitals varied greatly in their accomplishments. Many of the courses were too ambitious considering the teaching staff that was available. Those courses of a more limited scope were the most successful and the only type that should be permitted.

Assignment of medical officers temporarily to service command hospitals in order to acquire needed techniques and other information proved to be a very helpful means of strengthening certain hospital staffs.

Intern teaching programs were established in order to provide additional instruction for recently graduated physicians entering the service. These young officers were assigned as assistants to the best qualified ward officers. They accompanied the chiefs of service on their rounds and received 1 hour or more of didactic instruction each day. The majority of these young physicians were enthusiastic, energetic, receptive to instruction, and helpful in the operation of the wards to which they were allocated.

During this emergency, the space, fixtures, and equipment apportioned for libraries were often inadequate. In some hospitals, the libraries were so dissipated by informal loans to service and section chiefs as to be of little value to other staff members. In the institutions where they were readily accessible, attractively furnished, and well managed, the libraries played important roles. The number of current medical journals received by the larger hospitals represented an excellent cross section of the better periodicals. However, the quota of books originally supplied was inadequate both numerically and qualitatively. This inadequacy was due largely to unnecessary duplication, such as from 6 to 8 volumes of *Christopher's Textbook of Surgery*, *Cecil's Textbook of Medicine*, *Dorland's Medical Dictionary*, *Useful Drugs*, and other books to a lesser degree. Later, the libraries were supplemented by additional books and purchases from specifically allotted funds. In addition, books and periodicals were loaned by the Army Medical Library, medical

schools, and societies, whose generous cooperation enhanced the education of medical officers.

The educational program in the Eighth Service Command was more comprehensive than that of other commands because the surgeon and the consultants obtained a substantial yearly grant from the Rockefeller Foundation. These additional funds made possible better libraries, the distribution of clinicopathologic conference case material, and the active participation of visiting professors in the teaching program.

Considerable time was devoted to the selection of the volumes needed to provide each hospital in the Eighth Service Command with a library sufficiently complete to furnish definitive information concerning all medical and surgical diseases. The books were then purchased and distributed. This undertaking not only profited the hospital staff but also served to demonstrate that small civilian hospitals could have reasonably comprehensive libraries without spending large sums of money.

The use of case teaching by means of clinicopathologic conferences, first introduced in the Eighth Service Command through the grant-in-aid from the Rockefeller Foundation, was very well received. The numerous requests for this material finally led the foundation to make it available to all service commands. Selected case reports of the type published in the *New England Journal of Medicine* were obtained from the Massachusetts General Hospital for these conferences. Two such case reports were distributed to each service command installation each week. The hospital staffs were urged to conduct these conferences in much the same manner as is done at the Massachusetts General Hospital. The success of the conferences depended in large part on the ability of the hospital pathologist to teach and to invite discussion. Participation in these conferences by the staff members necessitated reading the medical literature and keeping in touch with the newest developments in medicine and surgery. In addition, the conferences served to maintain interest in those diseases not encountered frequently in Army hospitals.

Case records pertaining to the major psychoses, psychoneuroses, psychosomatic disorders, and neurologic diseases were distributed to all hospitals. These were used in much the same manner as the clinicopathologic case-teaching material. They were well received and stimulated interest in neuropsychiatric disorders.

Another and extremely important feature of the educational program in the Eighth Service Command was the provision for the active participation of eminent teachers. The annual budget was sufficient to permit nationally known internists, surgeons, neuropsychiatrists, orthopedic surgeons, and, for a time, radiologists to visit the service command hospitals. Once such specialist accompanied the corresponding consultant on his monthly tour of hospitals. Each visitor spent 2 or 3 weeks in the service command, depending upon the length of leave granted by his medical school. The foundation grant paid his traveling expenses and provided him with a modest honorarium. The invited

guest joined the service command consultant in making ward rounds, holding clinics, and in roundtable discussions. Formal lectures were not featured with any regularity because of the desire to have the visiting physician demonstrate, by actual performance, good medical practice.

Initially, the consultants and their visiting specialists visited all types of service command installations. With the institution of the regional consultant system, visits were confined to the regional, general, and large station hospitals. The continued participation of the staffs of the satellite stations in such exercises was made possible by having the commanding officer of the parent or host institution invite the staff members to attend. This they did with great regularity. Not infrequently, the staff members requested aid in the solution of some of their more recent therapeutic and diagnostic problems, and occasionally they presented cases. While at the parent hospital, the consultant and his visitor were available for consultation to the satellite installations.

Seeing the visiting professors intimately and in action had a most stimulating effect upon the medical officers. They appreciated brushing shoulders with these leaders and eminent authorities of the profession, submitting cases to them, and having the benefit of their experiences and opinions. The give and take of the ensuing discussions provided the medical officers with professional experiences of great and lasting value rarely to be had in private practice.

An unexpected result of these educational programs was their effect on the visiting professors. The two impressions most frequently discussed by the civilian consultants are worthy of recording. First, the consultants were of the opinion that, concerning diagnostic facilities and technical equipment, military medicine was at a very commendable level. Second, they were agreed that most of the graduates of American medical schools had not been taught sufficient psychiatry to enable these graduates to practice comprehensive medicine. Several of the distinguished consultants returned to their medical schools determined to make changes in teaching methods. One wrote that his tour of military hospitals had opened his eyes to the role of psychosomatic medicine and convinced him of the importance of teaching the fundamental principles of psychiatry not only in the department of psychiatry but in every division of the medical school.

Many, especially commanding officers of hospitals, argued that the institution of educational exercises of the type just described would interfere seriously with the discharge of the medical officers' routine duties. Experience soon demonstrated that the beneficial effects more than compensated for the time required. The most important direct result of the educational programs was better medical care for sick soldiers. In addition, the programs furnished needed instruction for medical officers who came directly to the service after long periods of practice, and these programs continued instruction for the more recent medical school graduates.

If the Army Medical Corps is to provide the best possible medical care, it must fulfill certain educational obligations. In time of war, this obligation will necessitate greater discrimination in the use of the affiliated hospital staff

members,⁵ the Army's greatest source of clinical teachers. The assignment of most of these officers to key hospital positions and the establishment of systematic rotation of ward surgeons will provide excellent opportunities for the development of physicians.

ADEQUACY OF MEDICAL CARE IN ARMY HOSPITALS

This subject is one of prime importance to the historian. The discussion that follows represents thoughtful, thoroughly objective treatment of the subject. It is a summary of an appraisal written by Colonel Bauer, a service command consultant whose knowledge and experience rendered him exceptionally qualified for the task.

The medical care provided sick soldiers in Army hospitals was, in most instances, superior to that previously received in civilian life. This care was made possible through the organization and supervision of clinical activities, the unification of diagnostic and therapeutic procedures, better placement of medical officers, and continued education. Nevertheless, unnecessary fatalities did occur.

In criticizing Army medical care, it is important to stress that many of the deficiencies reflected more upon the undergraduate and graduate training of physicians than upon military medicine. Physicians often did not adjust well as members of disciplined teams, nor did they always accept unusual assignments graciously. The majority of officers, however, executed their responsibilities to the best of their ability despite handicaps such as new surroundings, unaccustomed administrative procedures, and unfamiliar professional duties.

Deviations from the basic principles of good medical practice were frequently observed in the form of poor doctor-patient relationships, unnecessary hospitalization, inadequate histories, absence of personality evaluation, incomplete physical examination, delayed clinical evaluation, institution of therapy before establishing a diagnosis, paucity of progress notes, inadequate treatment, and indecision in diagnosis, therapy, and disposition. These shortcomings were consciously or unconsciously compensated for by superfluous laboratory tests, radiologic examinations, consultations, clearances, and treatment. Such practices often bespoke either inadequate medical training or a feeling of insecurity on the part of medical officers and constituted some of the ietrogenic factors to which soldiers were exposed. Such factors further increased an already staggering neuropsychiatric rate.

Full documentation of other breaches and deficiencies would not justify the time and space required. It is sufficient to cite a few examples regularly observed, such as limited knowledge of communicable diseases; meager understanding of the principles of chemotherapy; unwarranted reliance on laboratory procedures; and lack of clinical judgment concerning the varied manifestations

⁵ Experienced teachers in medical units formed by a sponsoring medical school or hospital.

of rheumatic fever, infectious hepatitis, diphtheria, infectious mononucleosis, malaria, and diseases incurred in tropical regions.

The adequacy of medical care depended upon the professional qualifications, attitude, and performance of the chief of service and his fellow officers and also on their relationship to one another. It was demonstrated repeatedly that even with personnel of average ability a capable chief of service elevated medical care above the level of mediocrity by constantly striving for improved diagnoses, therapy, and disposition. In order to achieve this, he had to avoid being saddled with a heavy administrative load. Good leadership not only promoted better performance but also invited a more critical attitude and a free expression of opinion on all professional matters by medical officers, irrespective of rank. This atmosphere improved rather than diminished esprit de corps.

CLINICAL RESEARCH

At the outbreak of the war, the policymakers of the Medical Department of the Army were not favorably disposed to clinical research in Army installations. These administrators were preoccupied with the many and important problems involved in planning for supplies, hospitals, personnel procurement and management, and operations for the huge and steadily expanding Army; and, at the same time, they were concerned with the efficient operation of the Medical Department in relation to pressing current problems. Not only did clinical research fail to receive encouragement at this time, but attempts to carry out original studies were actively discouraged.

In time, this attitude changed. The influence of the consultants was of the greatest importance in bringing this about. They understood the Army's need for additional knowledge in order better to support the combat training program in the Zone of Interior and, later, the combat strength of troops in the line. This responsibility made research a very practical matter for the Medical Department. Many questions had to be answered. What disposition to make of patients with hepatitis? What treatment to employ for malaria? How to prevent and treat properly cold injury? How to prevent and treat heat exhaustion? These and innumerable other questions could be answered only after study, and often the studies could be made only with troops. As time passed, the attitude of the Medical Department in the Zone of Interior changed from one of active resistance to clinical research to one of passive acquiescence and, rarely, to one of wholehearted acceptance.

Only in isolated instances, however, was it possible to obtain the necessary priorities in material, transportation, and especially personnel. If priorities could be obtained at one echelon of command, it was common experience to have them denied at another. Nevertheless, clinical research developed in a modest way in certain places. In some of the hospitals designated for the care of special disorders and, less frequently, elsewhere, research actually flourished toward the end of the war.

The following comments regarding clinical research in three service commands are based on observations of the medical consultants who served in these commands and who often initiated and supervised studies. A summary of Colonel Thomas' experience in the Fourth Service Command follows:

There were several clinical research projects in some of the hospitals. Some officers turned out a great many papers; a few of them were quite good. Whenever the medical consultant saw an interesting and unusual case or a well-studied group of cases, he encouraged the chief of medical service and ward officer to prepare a report for publication. The Fourth Service Command Laboratory was interested in various studies including dysentery and meningococcic infection.

The influenza commission was established at Fort Bragg, N.C., where primary atypical pneumonia was studied. Members of the staff of that commission contributed to the program of a conference held in the service command and distributed information concerning their work. The large epidemic of meningococcic infections presented an opportunity for careful clinical and therapy studies. At Fort Bragg, Lt. Col. (later Col.) Worth B. Daniels, MC, studied an outbreak of a rare disease, which he called pretibial fever. On the whole, the medical personnel in the hospitals in the Fourth Service Command were not trained for clinical research. There were a number of cardiologists who collected rare forms of cardiac arrhythmia, and the gastroenterologists made valuable contributions in the study of peptic ulcers. The work on the use of prophylactic sulfonamides in aborting a meningococcic epidemic was of great value, and the studies along this line performed by the Fourth Service Command Laboratory personnel were outstanding.

A summary of a report by Colonel Adams, also concerning the Fourth Service Command, is presented in the following paragraphs.

The following studies and investigations were made in this command:

<i>Location</i>	<i>Study</i>
Batley General Hospital, Rome, Ga.	1. Clinical studies on acute pericarditis.
	2. Comparison of vaccine products and Brucellergen intradermal tests in brucellosis.
Finney General Hospital, Thomasville, Ga.	1. Malaria therapy in neurosyphilis.
	2. Penicillin therapy in neurosyphilis.
	3. Spinal-fluid Wasserman reaction during the course of and subsequent to malaria treatment of neurosyphilis.
	4. Studies on penicillin concentration in spinal fluid.
	5. Value of Thio-Bismol (sodium bismuth thioglycollate) in quartan malaria.
	6. Value of gastric analysis in the diagnosis of duodenal ulcer.
	7. Survey of bronchial asthma in soldiers.
	8. Studies in histamine-stimulated fractional gastric analysis.
	9. Statistical study of 200 cases of arthritis.

<i>Location</i>	<i>Study</i>
Foster General Hospital, Jackson, Miss.	<ol style="list-style-type: none"> 1. Clinical studies on rheumatic fever and rheumatic heart disease. 2. Value of salicylate therapy in rheumatic fever. 3. Effect of various adjuvants (such as sodium bicarbonate, ammonium chloride, and aluminum hydroxide gel) on blood salicylate levels. 4. Penicillin therapy in chronic bronchial asthma. 5. Clinical study of asthmatics returned from overseas.
Kennedy General Hospital, Memphis, Tenn.	<ol style="list-style-type: none"> 1. Evaluation of certain drugs in the treatment and control of malaria. 2. Studies on palmar sweating. 3. Clinical study of asthmatics returned from overseas.
Lawson General Hospital, Atlanta, Ga.	<ol style="list-style-type: none"> 1. Comparative value of liver-function tests in hepatitis. 2. Gastroscopic studies in acute hepatitis. 3. Electrocardiographic studies in various forms of heart disease. 4. Effect of amputation of the extremities on the electrocardiogram. 5. Evaluation of penicillin in treatment of skin disease.
Moore General Hospital, Swannanoa, N.C.	<ol style="list-style-type: none"> 1. Comparative evaluation of different drugs in treatment and suppression of malaria. 2. Clinical studies on filariasis. 3. Comparative evaluation of different drugs in treatment of schistosomiasis. 4. Evaluation of certain antigens in the diagnosis of schistosomiasis. 5. Comparative evaluation of different drugs and dosage in the treatment of kala-azar. 6. Clinical studies on hookworm infections. 7. Clinical studies of various forms of treatment in atypical lichen planus and eczematoid dermatitis. 8. Histopathology of atypical lichen planus. 9. Relationship of Atabrine (quinacrine hydrochloride) administration to atypical lichen planus. 10. Clinical studies of dermatologic and faucial diphtheria. 11. Study of metabolism of antimony by use of radioactive tartar emetic (in conjunction with the U.S. Public Health Service, Department of Zoology, National Institutes of Health).
Oliver General Hospital, Augusta, Ga.	<ol style="list-style-type: none"> 1. Combined penicillin-heparin therapy in subacute bacterial endocarditis. 2. Evaluation of various forms of treatment in atypical lichen planus. 3. Recurrence rate of malaria treated without specific drugs. Diagnosis of <i>Strongyloides stercoralis</i> infestation by duodenal drainage. 4. Statistical studies of the incidence and types of asthma in the Army.

<i>Location</i>	<i>Study</i>
Oliver General Hospital, Augusta, Ga.—Continued	5. Evaluation of Anthiomaline (antimony sodium thiomalate) in granuloma inguinale. 6. Evaluation of intrathoracic penicillin treatment of empyema.
Regional Hospital, Camp Blanding, Fla.	1. Studies on heat stroke. 2. Loeffler's syndrome in cases of <i>Ancylostoma braziliense</i> (creeping eruption).
Regional Hospital, Fort Benning, Ga.	1. Evaluation of immune globulin in the prevention of mumps orchitis. 2. Gastroscopic studies in infectious hepatitis 3. Evaluation of antistreptolysin titer in differential diagnosis of rheumatic fever. 4. Evaluation of sulfonamide drugs in the prophylaxis of gonorrhea. 5. Studies to determine the optimum dosage of penicillin in acute gonorrhea.
Station Hospital, Camp McCain, Miss.	1. Evaluation of sulfonamide drugs in the prophylaxis of meningococcal infection (in cooperation with the Fourth Service Command Laboratory).
Station Hospital, Camp Wheeler, Ga.	1. Evaluation of sulfadiazine prophylaxis in the control of respiratory diseases and meningococcal infection.
Thayer General Hospital, Nashville, Tenn.	1. Malaria therapy in neurosyphilis. 2. Penicillin therapy in neurosyphilis. 3. Effect on propylene glycol aerosol in barracks on the incidence of respiratory infection.
United States Army General Hospital, Camp Butner, N.C.	1. Studies on trenchfoot, including biopsy material, fluorescein studies of circulation, and mycologic studies of skin complications. 2. Value in hepatitis of the coagulation band, the Watson quantitative urobilinogen, and the quantitative methylene blue tests.
Welch Convalescent Hospital, Daytona Beach, Fla.	1. Studies on antiamebic drugs in diarrheal patients admitted by transfer with the diagnosis of functional gastrointestinal disease.
Regional Hospital, Fort Bragg, N.C.	1. Clinical and laboratory studies on pretibial fever. 2. Clinical, laboratory, and epidemiologic studies on an outbreak of bacillary dysentery (in conjunction with the Fourth Service Command Laboratory). 3. Intensive arsenotherapy of syphilis. 4. Penicillin therapy of syphilis. 5. Evaluation of Frei antigen. 6. Therapeutic value of penicillin-beeswax-peanut oil mixture in various infections, including gonorrhea, early syphilis, tonsillitis, pneumonia, and others. 7. A comparative study of penicillin and sulfadiazine in the treatment of pneumococcal pneumonia. 8. Studies to determine the optimum dosage of penicillin in acute gonorrhea.
Regional Hospital, Fort McClellan, Ala.	1. Use of estrin in the prevention of mumps orchitis.

<i>Location</i>	<i>Study</i>
Regional Hospital, Fort Jackson, S.C.	1. Evaluation of sulfonamide drugs in the prophylaxis of meningococcal infection (in cooperation with the Fourth Service Command Laboratory).
Station Hospital, Camp Forrest, Tenn.	1. Clinical study of an epidemic of tularemia.

An extensive study of methods for prevention and treatment of dermatophytosis was conducted at Fort Benning, Ga., from August 1942 through December 1945 by the Division of War Research of Columbia University, under contract with the Committee on Medical Research of the Office of Scientific Research and Development. The project was directed by Dr. J. Gardner Hopkins, Professor of Dermatology, College of Physicians and Surgeons, Columbia University. He was assisted by four trained mycologists and several technicians. Office and laboratory space were first provided at the regional (then station) hospital; later a barracks building was allocated by the post surgeon for a laboratory and clinic. Troops for surveys and testing of prophylactic measures were made available from various infantry regiments and other organizations on the post. Treatment clinics were held in two of the post dispensaries. In July 1945, the scope of the project was extended to include a study of penicillin therapy in all types of skin infection, including those secondary to dermatophytosis. A special ward in the regional hospital was allocated for these cases, and a trained Medical Corps dermatologist was placed in charge of the clinical work.

The following problems were investigated: (1) Incidence of fungus infection in infantry troops; (2) types of fungi and bacteria concerned in these infections; (3) effectiveness of prophylactic measures, including footbaths, powders, ointments, and special types of shoes in preventing dermatophytosis; (4) evaluation of new fungicides, including a number of antibiotics, in the laboratory; (5) evaluation of new fungicides in treatment of mycotic infections; (6) evaluation of antiseptics and the sulfonamides in treatment of secondary infections; and (7) effectiveness of penicillin in pyoderms and the frequency of sensitization resulting from its use.⁶ As a result of these studies, a new fungicidal ointment containing undecylenic acid was added to the supply tables. Methods for treatment of dermatophytosis and secondary infections were published in the *Army Medical Bulletin*. Close cooperation existed between the post surgeon, the hospital staff, and Dr. Hopkins and his group. The latter freely gave their services in consulting with the hospital staff on difficult dermatologic cases.

The Commission on Acute Respiratory Diseases, 1 of the 10 commissions activated by the Army Service Forces Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, reported to Fort Bragg on 19 October 1942. Its general objectives were: (1) To maintain continuous

⁶ A detailed discussion of these investigations appears in Medical Department, United States Army. Preventive Medicine in World War II. Volume V. Communicable Diseases Transmitted Through Contact Or By Unknown Means, chapter VII. [In press.]

observations of respiratory diseases as they occurred at Fort Bragg and to investigate their epidemiologic, etiologic, serologic, clinical, and prophylactic aspects; (2) to maintain a constant watch for the occurrence of influenza and to study any outbreaks of this disease; (3) to carry on studies of primary atypical pneumonia, with particular emphasis on its etiology; and (4) to conduct field investigations as directed by The Surgeon General.

This commission had its special laboratory in the regional hospital and had access to all clinical material. Its investigations were carried on with the full cooperation of the hospital staff. The members of the commission were most helpful to this hospital as well as to other installations in the command in performing special laboratory tests and in freely giving their expert clinical advice whenever called upon.

A summary is presented of an informative statement about research in the Fifth Service Command. The statement was included in a report by Colonel McGuire. The experiences at the Wakeman General Hospital, Camp Atterbury, Columbus, Ind., illustrate some of the not infrequent obstacles to well-planned investigations.

There were two major efforts to carry on well-planned investigations within the Fifth Service Command. One was a study of physiologic alterations in the circulation consequent to arteriovenous fistulas. This investigation was planned by Lt. Col. (later Col.) Daniel C. Elkin, MC, Chief, Surgical Service, Ashford General Hospital, White Sulphur Springs, W. Va.; a group of clinicians who were members of or selected by the National Research Council; representatives of the Surgeon General's Office; and the Fifth Service Command consultants in surgery and medicine. The study was conducted at Ashford General Hospital.⁷ A civilian clinical investigator, Dr. Eugene A. Stead, Jr., trained in the technique of measurements of circulatory physiology, was placed in charge of this project. Technicians and the necessary apparatus were brought to Ashford, where an extraordinarily large number of patients with arteriovenous fistulas were being prepared for surgical treatment. In a careful and thorough manner, alterations in blood volume and cardiac output and other changes in cardiovascular physiology before and after operation were investigated. Measurement of peripheral blood flow distal to fistulas was planned but abandoned following V-J Day.

The second investigation was a careful study of the nutritional status of the paraplegic patients at Wakeman General Hospital.⁸ This study was planned by the nutritional consultant, the chief of the surgical service, and the medical and surgical consultants of the Fifth Service Command. The project was first formally presented to The Surgeon General in May 1945 but was returned with the comment that the patients to be studied were definitely surgical

⁷ Elkin, Daniel C.: Arterial Aneurysms and Arteriovenous Fistulas Circulatory Effects of Arteriovenous Fistulas. In Medical Department, United States Army. *Surgery in World War II. Vascular Surgery*. Washington: U.S. Government Printing Office, 1955, pp. 181-205.

⁸ Medical Department, United States Army. *Surgery in World War II. Neurosurgery, Volume II*. Washington: U.S. Government Printing Office, 1959, p. 151.

and therefore the project should be carried on under the direction of the surgical consultant and the chief of surgery at Wakeman General Hospital. The project was then resubmitted in accordance with this suggestion, and formal approval was received under date of 11 July. In the interim, the conditions under which the project had been originally conceived were markedly altered. The cessation of hostilities in Europe diminished the flow of paraplegics to the hospital, reducing the supply of the more acutely ill patients. Personnel shortages made it difficult for the hospital to organize and properly staff a special ward for the care of the patients under observation. The construction and equipment of a laboratory for the considerable volume of analytical work required was deferred by the increasing emphasis on the enlargement of the reception-station and separation-center facilities which were located at Camp Atterbury, for it was through the camp administrative channels that approval of such construction had to pass. Such was the status of the project when V-J Day arrived. Shortly thereafter, it was recommended that the project be abandoned, and, with the concurrence of the service command headquarters, The Surgeon General gave authority to discontinue it in October 1945.

Col. Thomas Fitz-Hugh, Jr., MC, Consultant in Medicine, Third Service Command, from May 1944 to January 1945, provided the following comment on clinical research.

One of the highlights of this war has been the output of excellent clinical research publications by many medical officers. A great deal of valuable material has been accumulated under difficult and trying circumstances. The medical consultant is dutybound to encourage and aid such endeavors. By the same token, it is his duty to be critical of poorly organized, repetitious, and non-contributing publications.

RECONDITIONING

The delay in the development of a reconditioning program by the Army Medical Department was principally due to indifference in the Surgeon General's Office to a need which had been recognized by medical officers in the field installations. Stimulation from the field, and especially from the splendid Air Force program instituted by Col. Howard A. Rusk, MC, eventually led to reconditioning in Army installations. The need for such a program was evident from the single fact that medical officers in hospitals were ordered to retain their convalescent patients in hospitals until they could be returned to their units in full-duty status.

The interest of the service command medical consultants in the reconditioning units which ultimately came into being varied greatly. The consultants were almost to a man extremely busy and preoccupied with important matters for which they were directly responsible. Once a separate program for reconditioning became established, the medical consultants usually considered themselves relieved of responsibility in the matter.

Col. George P. Denny, MC, Consultant in Medicine, First Service Command, from January 1944 to December 1945, commented in his final report

on the reconditioning program for that command. The following paragraphs summarize his observations.

The usual reconditioning program at general and station hospitals for class I, II, III, and IV patients was in operation at the time of this consultant's assignment to the service command. This was set up and operated in accordance with Circular Letter No. 168, dated 21 September 1943, OTSG, U.S. Army. In March 1944, the medical consultant attended a meeting for reconditioning consultants of all service commands at Schick General Hospital, Clinton, Iowa.

U.S. Army Medical Center at Camp Edwards

In April 1944, a reconditioning center was set up at Fort Devens, Mass., and patients in classes I and II were sent there from all hospitals in the First Service Command. This center was a part of Lovell General Hospital, Ayers, Mass., and, because of the complexity of the program, the difficulty of obtaining machinery and materials, and the work necessary to adapt the barracks buildings available, the program got under way slowly. About the time things were working well, the whole activity was uprooted and moved to Camp Edwards, Mass., where in January 1945, it became a part of the U.S. Army Medical Center at Camp Edwards. This center was designed to take care of 6,000 men with the idea of freeing hospital beds for patients evacuated from overseas. Beds were quickly filled to capacity by class I and II patients, and many more patients were carried on furlough.

The original, primary object of reconditioning was to return as many men to duty as possible and to fit the remainder for return to civilian life. As the program progressed, it was found that only a small percentage could be returned to duty of any type, and the center became a vast waiting room of men who knew they were on their way out of the Army and who did not take kindly to the various moral, mental, and physical methods of improving their condition. This impression was derived from personal observation and talks with the officers concerned. The ideal of reconditioning was worthy and high but so complex and diffused that it appeared to choke itself.

At first, there was a tendency on the part of hospitals to transfer patients who could not by any stretch of the imagination be benefited and who should have been discharged at the hospital of origin. This procedure was gradually corrected, but reconditioning remained in part a dumping ground used by hospitals needing to free beds for anticipated new patients. Many men were sent directly to the reconditioning center from debarkation hospitals, some with either no records or very scanty ones and requiring examinations that could only be accomplished in the general hospital or by consultations. Finally, a consultation service and X-ray and clinical laboratories were established within the reconditioning unit, and, although medical officers in various specialties from the general hospital were still called upon, the hospital load was greatly lightened.

There were not more than two companies of medical patients (exclusive of neuropsychiatric patients). The usual medical census was only about 300 from a total of 6,000 in the center. Chronic skin disease represented about 50 percent of this group. Other common conditions were the residuals of acute infectious hepatitis, recurrent malaria, and the usual gamut of indefinite gastrointestinal complaints without definite organic disease. Little could be done for the dermatoses, but the gastrointestinal and malaria patients usually were returned to limited duty. Rehabilitation of patients with the residuals of hepatitis had been given special attention in 1942 and 1943 with little or no success, and the same was found true at the Camp Edwards center in 1945. No special diets were available, the assumption being—and rightly so—that if a man were well enough to be reconditioned, he should be able to eat at a general mess. It became common practice to dispose of these men by providing them 90-day furloughs with the hope of sufficient improvement at home to permit their ultimate return to duty—a fairly slim hope, as it turned out.

Each company had a medical officer in charge who saw all of his patients every day, if he could catch them between classes; and medical consultants from the professional service visited the companies routinely and on request of the officer in charge. If a man became sick, he was sent to the dispensary by the company medical officer where one of three things was done: (1) He was given appropriate treatment and returned to barracks, (2) he was referred to the U.S. Army General Hospital, Camp Edwards, Falmouth, Mass., for study and treatment, or (3) he was referred to the convalescent hospital professional-service consulting staff for their opinion and advice. The professional consulting service usually determined the type of disposition to be made.

Viewed from a realistic point of view, the convalescent and reconditioning hospital was essential for the freeing of hospital beds for patients evacuated from overseas, but its complex and unwieldy system of reeducation hardly merited the vast effort and expense put into it.

Colonel Bauer also had extensive experience with problems of convalescence and rehabilitation in service command hospitals. A summary of his comments on reconditioning follows.

In December 1942, one of the largest service commands, without the consent of higher authority, established detachments at three posts. Their purpose was the physical reconditioning of convalescent patients and the physical and mental rehabilitation of selected soldiers with neuropsychiatric complaints, to the end of saving training days and reducing the number of soldiers receiving certificates of disability for discharge. These detachments, located some distance from the hospitals, were independently operated under the direction of the post commanders and surgeons. If these three detachments achieved their aims, it was planned to establish similar units at all posts. Although their value was demonstrated in approximately 3 months, higher authority ordered that they be discontinued. Some months later, in September 1943, the previously mentioned Circular Letter No. 168 directed

the establishment of reconditioning units at all larger service command hospitals. These units were maintained for the duration of the war (fig. 36).

The program held promise of contributing to the military knowledge of the care of convalescent patients, for the good of both the Army and the soldiers. It was obvious from the outset that the program's success would depend upon a sound plan, executed with intelligent enthusiasm by the service command surgeons, the post surgeons, and the personnel in immediate charge of each unit. Failure to develop a satisfactory program more rapidly was due to many causes. There was insufficient coordination and direction from higher command, and a lack of understanding of the principles and purposes of reconditioning by hospital commanders and clinicians alike and, save for noted exceptions, no real, enthusiastic desire to do the job. Initially, with no extra personnel allotment, there was a shortage, particularly of trained individuals. However, this was corrected by creating a table of organization and by assigning a nucleus of trained men. Reconditioning units with intelligent, well-trained personnel accomplished a great deal. When such personnel was lacking, reconditioning became something to be tolerated. Where units operated in this atmosphere, lip service was usually given in the form of mimeographed schedules issued weekly showing exactly what patients in the four different classes were supposed to be doing hour by hour, day by day. Close scrutiny of such units frequently revealed many omissions and deviations from the printed schedule.

Although it is not directly related to the problem under discussion, attention should be directed to the problem of conditioning or hardening new troops. Many admissions to hospitals were necessary because of failure to adjust the physical training program in the Army to the material at hand. Usually, no difference was made in what was required physically of the college athlete or farm boy as contrasted with the clerk or bank teller. Lamé backs, sore feet, and general physical exhaustion were often causes of hospital admissions and the basis for the activation of underlying neuroses.

DIETETICS

During the war years, no problem relative to procurement of food supplies for the Army hospitals in the Zone of Interior was experienced, nor was there rationing for U.S. soldiers in these hospitals. The only problems in the Zone of Interior were those having to do with the preparation and serving of the abundant rations which were always available (fig. 37). The hospital soda fountains and candy counters made their usual inroads upon the balanced diets provided by hospital dietitians. The medical consultants, with other Army officers in similar positions, showed the traditional concern about the quality and quantity of food available for the soldiers for whom they were responsible, but actually the only real problem in the service command was to get the soldiers to eat the good food provided them. Poor hospital messes existed in service command hospitals but not for long. Dietetics in Army



FIGURE 36. Reconditioning at Percy Jones General Hospital, Battle Creek, Mich. A. Calisthenics in wards at Reconditioning Unit, Fort Custer, Mich. B. Mass calisthenics outdoors for patients at Reconditioning Unit, Fort Custer, Mich.



FIGURE 36.—Continued. C. Water therapy in pool. D. Carefully supervised activities in gymnasium.



FIGURE 37. Food service at Madigan General Hospital, Tacoma, Wash. A. Messhall.
B. Kitchen.



FIGURE 37.—Continued. C. Serving line with steam tables and huge automatic toaster (center rear).

hospitals, exclusive of the special diets prescribed in certain diseases (such as diabetes, gout, nephritis, hepatitis, and acute infections) was of little concern to the medical consultants.

The TM (War Department Technical Manual) 8-500, Hospital Diets, dated March 1945, was prepared in large part under the supervision of Col. Garfield G. Duncan, MC, who was on temporary duty in the Medical Consultants Division, OTSG.

MEDICAL SUPPLIES

Fortunately, medical supplies in abundant quantity were practically always available promptly to Army medical installations in the United States (fig. 38). Such shortages as were encountered were usually because of faulty implementation of the Army system of requisitioning, faulty interpretation of the function of a given hospital, and, therefore, faulty distribution of the supplies appropriate and available to that hospital. The procurement or distribution of medical supplies for general and station hospitals in the United States was never a problem, and the consultants had little occasion to deal with supply problems, except when acting as personal representative of a hospital commander to the service command supply officer or vice versa.

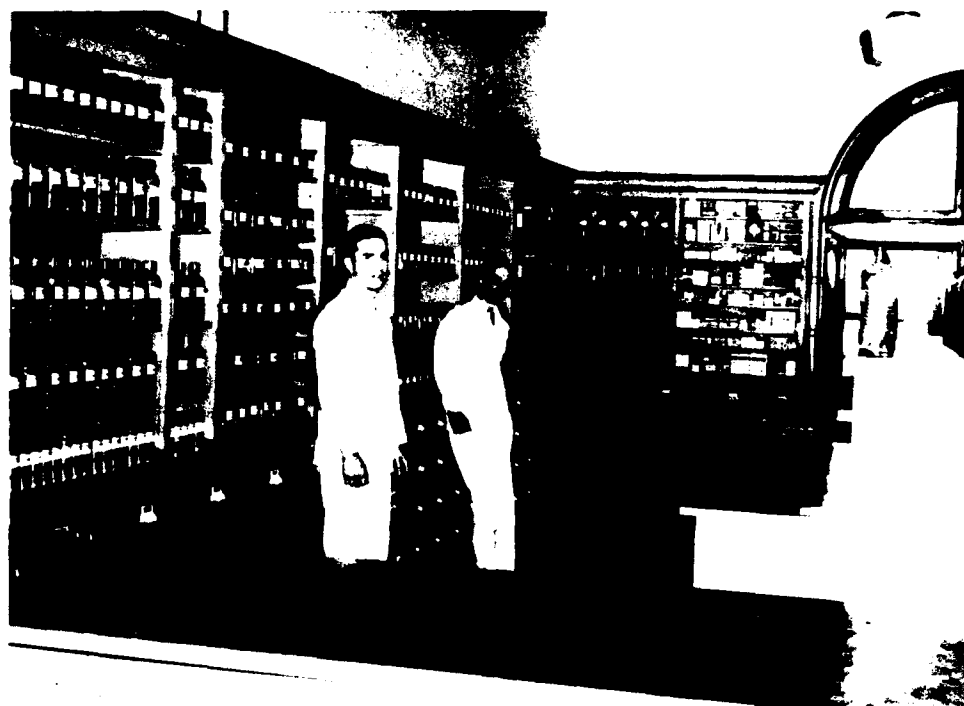


FIGURE 38. Well-stocked pharmacy at Percy Jones General Hospital, Battle Creek, Mich.

This role was a common one for the professional consultants, not only with relation to supplies but also in relation to many other matters, for they visited and actually were familiar with the medical units functioning within the boundaries of the service command in a way that was unique and, to a degree, rarely approached by any other headquarters officer.

NURSING CARE

Interesting comments on nursing in the service commands were submitted in the consultants' final reports. Col. John Minor, MC, Consultant in Medicine, Third Service Command, wrote approximately as follows:

Nursing in the service command hospitals was a very minor concern of the medical consultant. Medical officers, even in command positions in large hospitals, have minimal jurisdiction over nursing problems. In fact, except for inquiries as to the adequacy of care in case of sick patients or in supervision of special wards, the medical consultant had practically no contact with nursing problems.

Also concerning the Third Service Command, Colonel Fitz-Hugh noted that the chief problem in regard to nursing care which he encountered was occasional numerical inadequacy. However, this shortage was not serious. In general, the nursing care was excellent.

Col. Edgar van Nuys Allen, MC, Consultant in Medicine, Seventh Service Command, from August 1942 to December 1945, reported in general that



FIGURE 39.—Senior cadet nurses in training.

nursing care was usually adequate except when there was a numerical shortage of nurses. Experience indicated that wardmen could be trained to discharge many nursing duties in a satisfactory manner. In general, nurses served in a supervisory capacity, except in the case of seriously ill patients.

Colonel Marble reported on nursing in the Sixth Service Command. The following paragraphs summarize his comments.

The inauguration of the system of cadet nurses put into operation a plan which apparently worked excellently. For all practical purposes, a nurse who had had 2½ years' training or its equivalent in an accelerated program in a civilian hospital was as capable as one who had spent the full 3 years and was fully qualified to do her share of the nursing work in an Army hospital. The fact that she was obliged to stay only 6 months and the fact that the majority of cadet nurses chose not to remain in the Army was offset by the fact that when the 6 months' term of duty for one group of nurses was up, that of another group began. Although this consultant does not claim to know much about the Cadet Nurse Corps and the actual results achieved, in his opinion, the idea is an excellent one, which in another emergency should certainly be used in order to provide a sufficient number of nurses for the Zone of Interior (fig. 39).

Until the time of the establishment of the Cadet Nurse Corps, it was an almost universal complaint that there were not enough nurses in any of the hospitals. This was more or less true, but the whole situation was confused by various administrative precedents. In some hospitals, what seemed to be an unwarranted number of nurses were kept at administrative work in the office of the principal chief nurse. It was thought by some that the nurses could have been of more help doing professional work on the wards. A constant source of aggravation was the continual shifting of nurses from one ward or one section

of the hospital to another. Upon inquiry, it was always stated that the shifting of nurses was necessary because of two reasons: (1) An unbroken rule that at regular intervals every nurse must take her turn at night duty, and (2) the number of nurses actually available for duty from day to day was constantly changing as the result of leave, illness, days or afternoons off, and transfers in and out of the installation. Whatever the cause, the shifting of nurses when they had just become used to a given ward and trained in a specialized technique was a decided nuisance and resulted in a poorer quality of care for patients.

One complaint made by nursing supervisors was that in the average Army hospital there were not enough real nursing problems to challenge the capabilities of the nurses. As a consequence, over a period of time the nurses became less alert and less interested professionally. It is true that in the average Army hospital there are fewer patients who are acutely ill and who need specialized nursing care than are found in the average civilian hospital. The consequence often was that the nurse in charge of the ward spent most of her time doing clerical and administrative work. It will be interesting to observe what effect this practice has had upon the performance of these nurses on their return to civilian life.

COORDINATION WITH OTHER CONSULTANTS

The medical, surgical, orthopedic, and psychiatric consultants assigned to a service command had much in common. Their ultimate aims as medical officers were identical. They worked in the same administrative setting, employed the same channels of communication, often occupied adjoining offices in service command headquarters, and shared transportation on field trips. It is not likely that any other officers of the headquarters group possessed as much personal knowledge of the general medical activities of the command as did the consultants. The relationship between the consultants themselves and between them and the service command surgeon was often intimate, to the great advantage of all concerned. The following summary of comments by Colonel Adams, of the Fourth Service Command, provides a picture of how the medical, surgical, psychiatric, and orthopedic consultants coordinated activities among themselves, with the officers of other headquarters divisions and services, and with their chief, the service command surgeon.

The consultants representing the four major specialties—medicine, neuro-psychiatry, surgery, and orthopedic surgery—coordinated their efforts closely and worked in perfect harmony. Friction was nonexistent. Whenever possible, two or more of them made trips together, reviewed their sections of the hospital separately, and compared notes in the evenings. As a general rule, because of the inevitable interruption of work, hospital commanders regarded it as undesirable to have visits from more than three consultants at any one time; most preferred not more than two. By mutual agreement, whenever one consultant observed a situation that needed correction within the sphere of another's activities, he always reported it to his confrère. Such problems

or deficiencies otherwise might have escaped attention because of infrequent visits to a particular installation.

When two or more consultants visited an installation simultaneously, they sometimes conducted joint clinics or teaching rounds or together studied problem cases. It was hoped that such demonstrations with the free discussions that always occurred in the conferences would serve to promote similar interservice joint consultations with free discussion and to discourage sole reliance upon formal, written opinions.

Again, in the consultants' relationship with the officers of the other divisions and services in the surgeon's office, friendliness and close cooperation were the rule. It was the policy of the Surgeon, Fourth Service Command, that members of his staff returning from the field should report directly to the appropriate officer any observed deficiencies that fell within the scope of other divisions or branches. For example, if unsanitary conditions in a camp, a mess, or elsewhere were encountered, the chief of preventive medicine branch was notified. The discovery of any minor epidemics or threats of epidemics were similarly reported. Shortage of supplies or some special need, as for an instrument, for example, was referred to the chief of supply section. This system of direct reporting led to the more prompt correction of unsatisfactory situations.

A close and friendly relationship existed between the consultants and the officers in the Medical Personnel Branch, Military Personnel Division, Headquarters, Fourth Service Command. In spite of this, the consultants were often unable to advise the personnel officer regarding the assignment of medical officers as effectively as was desirable. The necessity for quick action and the established policies of the Military Personnel Division made it impossible for the medical personnel officers consistently to obtain the advice of the consultants when the latter were away from headquarters. A more generous use of telephone would have resulted in more effective distribution of the better trained officers within the command.

SERVICE COMMAND INSTALLATIONS OTHER THAN STATION AND GENERAL HOSPITALS

The relationship of the medical consultant to nonhospital medical operations within his service command depended in large part upon the attitude of the service command surgeon toward these installations and toward his consultant and the interest displayed by the consultant. Thus, in the Third Service Command, Colonel Minor made no visits to induction centers, reception centers, replacement centers, dispensaries, or outpatient clinics. He pointed out in his report many weaknesses with regard to professional care and professional personnel management that could have been avoided or rectified by cooperative action of the service command surgeon, the surgeon of the ground forces, and the post surgeon.

The following detailed comment upon the subject as it affects all service commands is based upon a report from Colonel Bauer, whose extra-hospital interests and activities were lively and who speaks from a fund of experience and knowledge of the consultant system in the service commands. The discussion includes the effects of improved ambulatory medical care of the soldier in training camps upon the noneffective rate and the effect of proper professional personnel management upon the morale of Medical Department officers.

The service command surgeons' policy affecting the relationship of the consultants to various service command installations governed the consultants' activities in the installations. Some service command surgeons considered the supervision of the care of the sick the consultants' sole function. Others regarded the consultants as their professional representatives and directed them to aid in the coordination of all medical activities of the service command. The latter policy is a most desirable one, but it cannot be realized until the requisite authority is delegated to The Surgeon General and the service command surgeons. When this is granted, it will be possible for them, with the aid of their professional consultants, to establish the proper type of integration of the Medical Department's activities at all Army levels. Such action will not only strengthen the Medical Department but also will really contribute to military planning, training, and operation. If such a scheme is ever effected, additional service command consultants will be needed to supervise and integrate properly the activities of the installations which are considered in the following paragraphs.

Induction stations.—In a few of the service commands, the consultants visited the induction stations frequently. The deficiencies most often observed were inadequate and poorly arranged quarters, workloads too large for the doctors to handle efficiently, insufficient social service investigation and psychologic examination, and a paucity of good neuropsychiatrists, competent radiologists, and qualified specialists to serve as consultants. The medical officers lacked the authority necessary for the proper execution of their duties. The most common infringement was dictation by line officers as to the number of rejectees permitted in a given period. Many certificates of disability for discharge, pensions, lost training days, and much hospitalization were directly attributable to poor screening at the induction stations.

Reception centers. Many of the induction station errors could have been unearthed at the reception centers if rescreening had been allowed. However, separation from the service or checking the work of induction stations at this level was either discouraged or prevented. Neither sufficient time nor personnel was allowed for the proper classification and assignment of the men received. These important decisions were made on the basis of quota demands and the inductees desire rather than on qualifications and aptitudes (fig. 40). In future mobilizations, reception centers should be charged with a greater responsibility in the classification and assignment of inductees. Detailed reports pertaining to improved selection and job assignment, based on excellent studies, are available.



FIGURE 40. Data for personnel and classification records being obtained from newly inducted soldiers at a reception center.

For a time, the treatment of venereal diseases at reception centers was not satisfactory. This was due to a lack of the necessary facilities.

Replacement training centers. The establishment of psychiatric consultation services in the replacement training centers was of immense value and represented a real advance in the medical program of the Army. The better psychiatrists demonstrated most impressively the role of educational, preventive, and treatment methods in the assignment and training of soldiers. The line officers were cooperative and appreciated the help received. The efficiency of these psychiatric consultation services was impaired at times because of lack of clinical psychologists, social service workers, interviewers, and stenographic and clerical assistants.

Camp dispensary and outpatient services.— During the training period, the sick soldier was first seen in a company, regimental, or camp dispensary (fig. 41). In retrospect, it is apparent that failure to organize and integrate the medical facilities at each camp made it impossible to provide adequate ambulatory medical care. There is little to be gained from a lengthy exposition of the evils of isolated dispensaries, furnishing only crude medicine in most instances; crowded hospital outpatient departments, where the harassed medical officers could only guess as to the cause of symptoms; and abuse of the hospital receiving office function, where proper selection was not permitted.

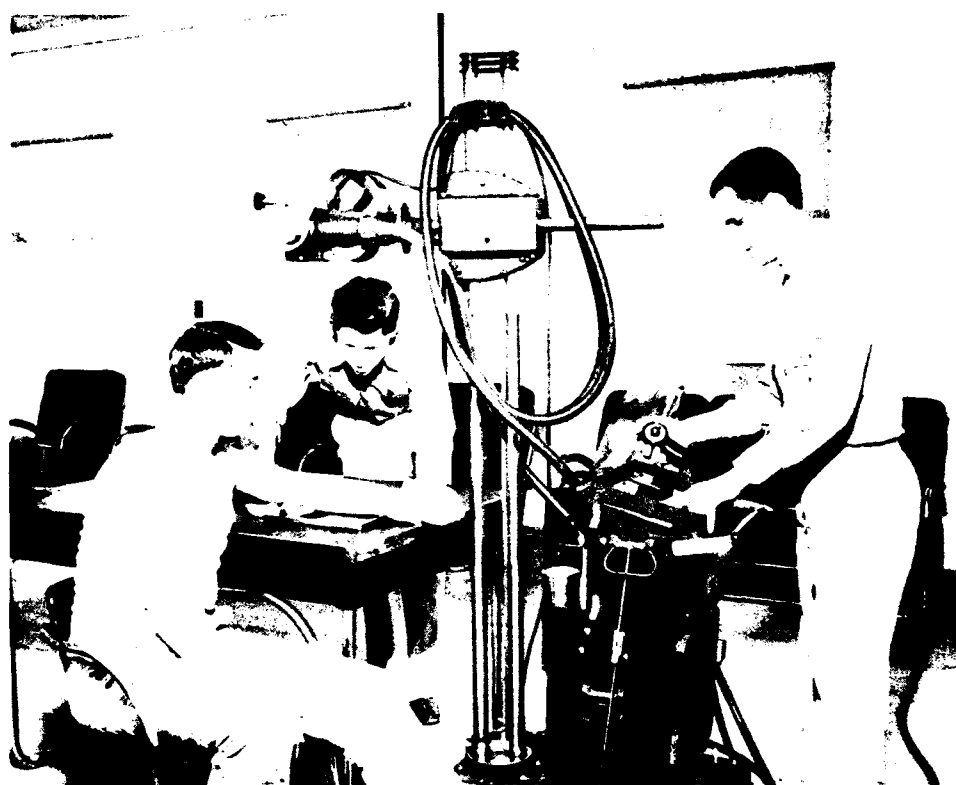


FIGURE 41.—New Picker portable X-ray equipment being put to use in the outpatient service, Camp Rucker, Ala., July 1942.

and, as a result too many admissions were allowed and unnecessary hospitalization, with its attendant evils, was encouraged. The institution of an ideal camp medical service requires that the post surgeon be delegated full responsibility for the health of all soldiers on the post.

The first essential for an adequate camp medical program is a strong dispensary service. The assistant chief of the station hospital medical service, who also serves as chief of the camp dispensary service, should therefore be an energetic, well-trained internist with a working knowledge of or interest in psychiatry. Once the proper organization is effected, supervision of the dispensary would not require more than 50 percent of the chief's time. On visiting the dispensary not less than every second day, he should demonstrate by example that adherence to the basic principles of good medical practice accomplishes the desired goal.

Unfortunately, the Army failed to stress that the dispensary surgeon is the key person in effecting the lowest possible noneffective rate. Dispensary surgeons must realize their importance to the Army, be vested with the necessary authority, have protection against undue pressure by command to hurry with sick calls, receive support and supervision of their clinical activities, be included in the professional and social activities of the hospitals, and share in a just rotation system. In many instances in World War II, these conditions

were not met, and this explains the development of many bitter, disillusioned, ineffective medical officers, who did more harm than good.

Because of assignment practices and notions concerning the prestige and the relative importance of work done, there was a regrettable and erroneous overevaluation of the hospital staff positions. This misinterpretation merits special attention by responsible leaders in the Army Medical Corps, since a good dispensary physician is much more valuable than a hospital ward officer. The scope of the physician's activities is much wider and demands infinitely more enterprise, social skill, and emotional and administrative adaptability, for he is physician to a large group of men and the logical source of advice on all matters pertaining to health and morale. Due to his position and special vantage point, he can do much to help line officers fulfill their obligations as leaders. There is literally nothing in the soldiers' lives which may not be of concern to command and hence to the dispensary surgeon who should be a sensitive observer and an accurate transmitter of information to responsible officers.

The dispensary service is the most strategic location for the management of psychosomatic complaints. Therefore, it is important that the dispensary surgeons appreciate that most of the soldiers seen on sick call are suffering either from relatively minor illnesses or from concern over personal health and welfare. The majority of these patients can and should be treated on an ambulatory basis. On the one hand, if these individuals are returned from the dispensary level without adequate examination, treatment, and reassurance, they will continue to worry about their health, will lose confidence in the Medical Corps and become less effective in their assignments. On the other hand, if they are unnecessarily referred to the consultation clinic or needlessly hospitalized, they are very apt to assume that the dispensary surgeon is in doubt or that their symptoms indicate the presence of serious disease. Such practices increase the neuropsychiatric casualty rate and loss of training days as well as make it evident to soldiers that disability is an asset. Most of them ask such questions as: "What have I got?" "Will it get worse?" "Can I take a 20-mile hike?" Some semblance of an examination at this time and an explanation as to the cause of the symptoms, assurance, and simple psychotherapy frequently are all that are needed. Fulfilling these requisites keeps at a minimum the all too common gripes: "He thinks I imagine it." "He called me a 'gold-brick' ('screw-ball,' 'eight-ball')." "All I ever get at the dispensary is the brush-off."

The dispensary surgeon's multitudinous and important duties prevent him from personally undertaking detailed diagnostic studies. Therefore, he must have access to a strong hospital outpatient clinic and good camp and hospital psychiatric services. If the consultations are to be of maximum benefit to the soldier, the dispensary surgeon must maintain good liaison with the people who provide them in the outpatient clinic and should inform them regarding the soldier in his Army environment. Such consultation privilege must be used with discrimination. It is extremely important that

the responsibility for the patient remain principally with the dispensary surgeon and that all personal problems be referred back to the dispensary surgeon and the scene of conflict, usually the soldier's platoon, company, battalion, or regiment. In order to avoid unnecessary hospitalization, there must be adequate facilities for soldiers treated on quarters status. Dispensaries, properly designated barracks, or the convalescent annexes can be used for this purpose. Reconditioning should be made available for ambulatory dispensary patients if quarters status is not desirable or permitted.

Station hospital outpatient clinics, when properly organized and directed, were of great value to the dispensary surgeon. In these clinics, soldiers were furnished with good professional care, and unnecessary hospitalization was prevented. The effectiveness of the outpatient service in station hospitals was one of the best indexes of the quality of medical care rendered by these hospitals. In the future, the importance of good outpatient clinics should be stressed.

The functioning of the camp dispensary service and hospital outpatient clinic in the manner described necessitates their inclusion in a complete camp medical service. This facilitates the rotation of all camp medical officers, except for key personnel, through the dispensary service for a period of not more than 4 months. This type of duty would acquaint the majority of medical officers with the importance of good ambulatory care in maintaining the lowest possible noneffective rate. Regular rotation of medical officers removes the onus of discrimination and punishment, so frequently associated with indeterminate assignments to the dispensary service; encourages better performance of duty; and permits greater professional development.

The number of officers assigned to a dispensary will depend upon the number of soldiers served. If two are required, selection and assignment should be so effected that the ranking officer is the more competent physician.

A camp medical service so organized affords maximum performance and effectiveness of its medical facilities, provides proper preventive medicine, and gives all medical officers a greater sense of responsibility with keener appreciation of the many camp medical problems. In addition, it makes possible better qualified, more efficient, and happier medical officers.

Ports of embarkation. The medical activities at ports of embarkation should have been more closely integrated with those of the service commands. This cannot be accomplished until the former are under the jurisdiction of the service command surgeons. Though the hospitals always welcomed them, there was too much division of authority to enable the consultants to be of maximum aid to the port surgeons in the solution of many problems that arose.

Separation centers.—The process of separation mirrored the induction examination with all its handicaps (fig. 42). It was readily apparent that most



FIGURE 42.—Separation Center, Fort Dix, N.J., October 1944. A. A step in medical processing. B. Lost to the Army, discharged soldiers on their way home.



FIGURE 43. Geared for mass evacuation of patients in transit, ambulances from debarkation hospital awaiting docking of hospital ship, Charleston Port of Embarkation, S.C., January 1944.

separation centers would have functioned better if measures similar to those recommended under induction stations had been instituted.

Other service command installations which may be of interest to the medical consultant are discussed in the following paragraphs.

Hospital centers for special diseases. The establishment and operation of these centers have been discussed on pages 33-39.

Debarkation hospitals. This designation was given hospitals used for the reception of patients transported from overseas by water and air. These hospitals were generally administered well, but it must be said that the compulsion to evacuate patients to hospitals located inland, in order to have empty beds available, often made difficult proper triage and treatment of patients in transit (fig. 43). The lack of judgment with regard to this matter was on occasions incredible. Transportation and evacuation seemed to become the end and not the means—the empty hospital bed the goal and not a facility for providing necessary treatment for the sick and injured. This unsatisfactory situation was clear to medical consultants, and they often fought the tendency to impersonal decisions, group management, and the premature movement of overseas patients in the evacuation chain to their ultimate hospital destinations in the United States.

CONSULTANTS' EVALUATION OF THE CONSULTANT SYSTEM

Summaries of evaluations of the consultant system, its weaknesses and strengths, its failures and accomplishments, as formulated by a representative sample of the opinions of the medical consultants to the service commands are herewith presented. Their statements were prepared soon after V-J Day. They were formulated in a spirit of thoughtful, constructive criticism by individuals of great competence and of complete loyalty to the United States Army and its Medical Department and also to the highest ideals of medicine.

First, are presented the views as generally expressed by Colonel Adams, medical consultant to the Fourth Service Command from September 1943 to December 1945. His comments are summarized, as follows:

It is believed that the consultant system as set up in the service commands contributed definitely to the welfare of the patients. In anticipation of this report, a questionnaire was sent to the chiefs of medicine of every hospital in this command. With one exception, the replies indicated that the consultants' visits were helpful and stimulating but too infrequent.

The following is a summary of Colonel Adams' criticisms of the consultant system as it operated during World War II:

1. In a large service command, such as the Fourth, one consultant in each major branch was not enough. Each consultant should be able to visit an installation at least once from every 3 to 4 months instead of from every 8 to 12 months. This arrangement could be accomplished by assigning assistant consultants, who could be responsible for bedside visits and personnel evaluations in a specified group of hospitals. Then, the service command consultant, using the information provided by his assistant, could cover the command more rapidly and frequently, concentrate on trouble spots, and devote more time to teaching, personnel assignments, and general supervision.

2. The suggested plan of having the chief of service in each large hospital visit nearby smaller stations was not practicable. The chief of service in any large installation usually has more duties than he can discharge adequately. To send him away for several days each month to visit other stations would result in increasing the backlog of his own work.

3. To execute his mission properly, the consultant should have a grade commensurate with his duties and with his relative importance as an officer of the Medical Department of the Army.

Next, a summary of the opinion of Colonel Denny, medical consultant to the First Service Command from January 1944 to December 1945, is presented:

The uses and possibilities of the service command consultant can be illustrated by a visit to the northern bases in Newfoundland, Labrador, Iceland, and Greenland made by the First Service Command consultants at the request of the Eastern Defense Command. Most of the medical officers in these isolated stations had been on such duty from 2 to 3 years without a

visit from a medical officer who was primarily interested in the clinical work being done. The hospitals were small and not active when visited in May 1945 and probably not much was accomplished professionally by the visit, but the interest and gratitude of the medical officers was, in many instances, almost pathetic. Physical and professional isolation lowers medical interest and general morale. Visits by consultants much earlier in the war would have been of real value to these medical officers, almost all of whom were well-trained and conscientious men who by reason of their isolation had come to feel that no one in higher authority took any interest in their professional work. Given sufficient authority consultants might well have been able to rotate such officers before dry rot set in.

Colonel Fitz-Hugh, medical consultant to the Third Service Command from May to December 1944, expressed primarily the following views in his evaluation:

1. The medical consultant system as it operated during World War II was fundamentally sound and necessary. Some of the difficulties and problems inherent in it were no doubt unavoidable; some could be corrected.

2. The autonomy of the service command and the necessity of going through channels at times impaired the relationship of the service command consultant to the chief consultant in the Surgeon General's Office. Higher authority in the service command at times resented direct communication between the service command consultant and the chief consultant in the Surgeon General's Office. If possible, this conflict should be resolved.

3. The autonomy of the service command also made it difficult for an overall adjustment of key personnel needs. The office of the chief consultant in the Surgeon General's Office is the only qualified central authority possessing the necessary knowledge of personnel qualifications and institutional needs. Therefore, in the future, the authority and power of the central authority should be increased.

4. The service command consultants' concern with professional personnel should be more effectively implemented. The consultants should, through the office of the chief consultant in the Surgeon General's Office, be given more real authority over assignment, transfer, and reassignment of professional personnel. If this authority is considered unwise, then the consultants should be instructed to keep out of personnel problems and to confine themselves to the task of trying to improve the personnel of each installation as they find it.

5. The selection of consultants in the recent war was generally well done. In the opinion of this consultant, the service command consultants should always be men who are fully qualified and have proven themselves adequate as consultants and teachers in civilian life. The outstanding qualities of General Morgan were no doubt responsible for much of the best that came out of the consultant system in this war. All consultants should not only be good enough to rank as full colonels but should have this rank. If an inflation of grade occurs in the next war, then the consultants' grade should also be comparably inflated.

6. Finally, the Medical Corps of the Army, in general, was undergraded and promotions were too slow and too few. Improvement in this important aspect of military service would result in much better morale.

Colonel Minor, medical consultant to the Third Service Command from December 1944 to December 1945, summarized his opinion of the consultant system, generally, as follows:

The medical consultant service was an important addition to the Medical Department and served very well the functions for which it was planned. These functions were (1) to assist in establishing and maintaining professional staffs as well qualified and as stable as possible in hospitals and other installations; (2) to oversee the general picture of medical professional care in the command medical installations, to keep the staffs informed of recent advances, and to bring the practice of medicine to as high a level as possible; and (3) to furnish consultation of professional and often personal nature for the medical officers, develop educational programs, stimulate special study projects, and minister in these important ways to the total professional morale of the medical officers.

A corollary to these functions was, of course, the maintaining of close relationship with the surgeon, by making suggestions and preparing directives about professional matters for his signature. An additional function was the correlation of activities with the surgical and neuropsychiatric consultants.

The consultant functioned to a very large degree on a personal basis because duties of the position, while of evident importance, were not officially integrated into the preexisting planning for the Medical Department. The consultant's activity, therefore, and his ability to accomplish his objectives depended first on his relationship to the surgeon and the amount of confidence and respect he earned from his direct superior and, secondly, on the same factors in the commanding officers and the key professional officers of the hospitals with whom he worked. In other words, it was necessary for the consultant to sell himself as a useful and competent individual with something to offer before he could function effectively, there being no recognized or official status for his job. As a result, success in accomplishing his mission was largely dependent on developing such relationships.

It was Colonel Minor's opinion that the quality and amount of interest taken by the service command surgeon in the professional matters that were the prime concern of the medical consultants was a determining factor in the effectiveness of the consultant system. The consultant was clearly responsible to the service command (through the surgeon) and had only an associated relationship with the Surgeon General's Office. All administrative power was placed in the hands of the service command headquarters; that is, in the hands of the commanding general. It was therefore necessary to sell one's wares to the commanding general directly, when possible, or indirectly through the surgeon or other officers. In this command, the policy of complete control of all installations on a post by the commanding officer of the post raised many serious difficulties in the allocation and shifting of medical personnel. All the

methods that could be used by the consultants to bring about needed changes sometimes failed to overcome the opposition or passive resistance of the commander of a post, who might be an infantry officer with no knowledge and little interest in the real medical problems at hand. Similar difficulty was occasionally encountered with medical officers commanding hospitals, but in large part these officers were cooperative. A point of view not infrequently encountered was that one medical officer was the same as another, and this without regard to special professional training or ability. This viewpoint might be called the "doctrine of the body." However, as time passed, there developed realization among even the most reactionary medical officers that special men were required for special jobs.

The most effective portion of Colonel Minor's work was visiting the hospitals in the service commands. It was necessary at the start to make clear that these visits were not inspections in the usual Army sense. When the professional staff realized that the consultant was interested primarily in good work, in the advancement of competent men and their proper assignment, and also sincerely interested in their personal problems, little opposition or resentment was encountered. The more time spent in visiting, the more effective was the consultant. With rare exceptions, the consultant was made welcome and was able to establish satisfactory liaison with the various officers, administrative and professional, who operated the post.

The promotion of educational activities and the holding of formal and informal discussions with members of the staffs to consider professional problems of importance furnished an opportunity for free interchange of ideas, which was mutually beneficial.

Ward rounds were of great importance from three standpoints: (1) They afforded the best opportunity for the consultant to evaluate and to know the officers on a service; (2) they provided an overall view of the management of patients and of diseases, as for example, diabetes, rheumatic fever, hepatitis, syphilis, gonorrhea, arthritis, pleurisy, and others; and (3) they made possible a review of problem cases by the consultant, which was an interesting and instructive exercise and often contributed directly to improved management of the case at hand.

In the preparation of reports of visits, an effort was made to give a general picture of the operation of the hospital from a professional angle; to evaluate with fairness and frankness the various officers; to describe important professional problems and the methods by which they were handled; to make recommendations as to the proper classification of officers by MOS numbers; and to recommend promotions when deserved.

The relationship of the medical consultant to the Surgeon General's Office was as close as was permitted by the organization described. It was, of necessity, largely on a personal basis, as the Surgeon General's Office was unable to implement its plans with regard to personnel or method without the consent of the service command. In the case of the Third Service Command, nearness to the Surgeon General's Office and the warm personal relationship

existing between the officers there and all the service command consultants made possible the solution of many personnel problems. Also, questions of policy and procedure were readily ironed out by means of this direct, personal contact.

The medical consultant service in the Third Service Command earned its way and proved itself a most valuable addition to the organization of the Medical Department. In the long view and from the standpoint of promotion of the best in medicine, it can only be called an essential element to the proper functioning of the Medical Department. In spite of frustrations, difficulties in administration, and the reliance on personal relationships to achieve ends that could be attained only in that way under the existing system, the medical consultant plan achieved important success and was of great benefit to the practice of medicine in the command and to the development and proper use of professional personnel.

Colonel Marble, medical consultant to the Sixth Service Command from March to September 1945 made, generally, the following observations:

1. There is no doubt that the consultant system is worthwhile. It is imperative, particularly during times of expansion of the Army, that medical officers with the necessary professional qualifications be assigned to service command headquarters to advise the service command surgeon on professional matters and, by visits to medical installations throughout the command and by other contacts with medical officers, to promote and maintain high standards of professional care.

2. It is desirable that the position of the consultant in the service command headquarters and throughout the service command be clarified so that administrative difficulties may be avoided and the carrying out of professional policies expedited.

3. Some plan should be worked out whereby free and informal contact by the consultant with higher authority (Medical Consultants Division, OTSG) and medical officers throughout the service command may be possible on purely professional matters, without arousing concern that administrative channels have been bypassed.

4. One of the greatest fields of usefulness of the consultant is in his advice to the service command surgeon and the headquarters personnel officer regarding the proper placement of medical officers. By his personal professional contacts, the consultant after a period of time comes to know the professional qualifications of medical officers and the professional needs of various installations in the service command better than any other officer on the staff.

5. The next greatest field of service of the consultant lies in the teaching and professional encouragement of medical officers by frequent and prolonged visits to hospitals and other medical installations.

Colonel McGuire, medical consultant to the Fifth Service Command from July 1944 to December 1945 summarized his endeavors, in general, as follows:

1. To be of assistance to the service command surgeon and the chief

consultant in medicine in the Surgeon General's Office by keeping both constantly informed of professional and personnel problems on the medical services of the general and station hospitals.

2. To be of assistance to the chiefs of the medical and laboratory services of service command hospitals by: (1) Presenting their personnel problems to the attention of the service command surgeon; (2) conducting teaching ward rounds and attempting to stimulate the section chiefs and ward officers to carry on their professional duties at the highest possible level; (3) stimulating clinical research; (4) encouraging scientific meetings of high quality; (5) recommending transfer of mediocre medical officers; (6) recommending changes to improve physical location and administrative procedures of medical libraries; and (7) obtaining clarification of confusing administrative procedures for chiefs of medical service from the service command surgeon and the Surgeon General's Office.

Colonel McGuire stated further that, if the consultant system should be needed in the future, a clearer definition of the consultant's responsibility to the service command surgeon as compared with his responsibility to the chief consultant in medicine in the Surgeon General's Office, would be of value. In the Fifth Service Command, no problem arose, since there was perfect cooperation between the service command surgeon, the chief medical consultant, and the service command consultant. However, it may be difficult to serve two masters, and, unless the consultant's fundamental responsibility be more precisely defined, it is clear that on occasion his position will be ambiguous.

To prevent misinterpretation of the function of a professional consultant and to avoid being regarded as an inspector, the professional aspects of the consultant's function should be emphasized and the administrative aspects minimized. However, since the best available personnel are essential to the maintenance of the highest professional standards, it was the opinion of this medical consultant that assignment of key personnel to the medical services of hospitals should be made only on the recommendation of the service command consultant.

Finally, in a summary and critique prepared in 1945, Colonel Bauer, medical consultant to the Eighth Service Command from August 1942 to August 1945, presented the views expressed in the following paragraphs.

Regardless of the accomplishments or shortcomings of individual consultants, there can be little doubt that the consultant system has favorably influenced the medical service of the Army and therefore should be included in its permanent organization. It has served particularly to focus attention on the primary importance of the professional aspect of military medicine.

The problem now [1945] is not so much the future of the consultant system as what to do about the future medical service of the Army. The high standards of professional care attained in this war must be maintained and advanced. The way must be opened for capable and ambitious young officers to progress in their profession. Postgraduate opportunities must be made available to a

sufficient number of officers of the Medical Corps to furnish the Army a group of qualified specialists in the various branches. These men should receive recognition in the form of rank and pay commensurate with their eminence in their profession and the weight of the duties that they will be required to perform.

The benefits of the experience gained by the group of men who have acted in the capacity of consultants in the service commands during this war should not be lost to the Army. Through this experience, they have acquired an insight into the practical workings of the Army Medical Corps. This, joined with their professional knowledge in various special fields, fits them for the task of evaluating the future needs of the medical service of the Army.

Colonel Bauer made the following recommendations:⁹

1. That the Medical Department be represented on the Army staff at the departmental level instead of being relegated to a subordinate position such as was the case in the Services of Supply and Army Service Forces reorganizations during World War II. This representation of the Medical Department at the highest level will provide better opportunity for the integration of medical activities throughout the Army and restore to the Medical Department more prestige and autonomy. It is hoped that the changes in staff organization at all levels implicit in this recognition of the responsibility of the Medical Department will permit it to make a greater contribution to all military planning, training, and operations.

2. That the Medical Department formally recognize different career patterns for medical officers who are primarily interested in staff and command functions from those who are primarily interested in the professional practice of medicine or in research and provide appropriate training, assignments, and rewards to each group.

3. That the consultant system, as evolved during the present conflict, be retained and extended.

⁹ The original recommendations made by Dr. Bauer were revised in a letter from Dr. Bauer to Col. J. B. Coates, Jr., MC, Director, The Historical Unit, U.S. Army Medical Service, 9 Nov. 1956, and a letter from Col. Coates to Dr. Bauer, 19 Nov. 1956.

CHAPTER III

Mediterranean (Formerly North African) Theater of Operations

Perrin H. Long, M.D.

FUNCTION AND DUTIES OF A MEDICAL CONSULTANT IN AN OVERSEA THEATER OF OPERATIONS

The advent of World War II found the Medical Department of the U.S. Army without a professional consultant group in either medicine or surgery. From the middle of 1940 until shortly after the entry of the United States into the war, an attempt was made to overcome this deficiency by the establishment of liaison, in strictly professional matters, between the various newly created advisory committees of the Division of Medical Sciences, National Research Council, and the Professional Service Division, Office of the Surgeon General. Between the end of World War I and 1925, when the Professional Service Division was formally established, the activities normally carried out by such a division had been performed by various professional offices or divisions of the Office of the Surgeon General.

Even after the Professional Service Division was set up in 1925, its scope had been limited and its functions poorly defined. It had been concerned chiefly with routine administrative matters, and its influence as a positive force in developing and guiding the professional aspects of medicine and surgery in the Army had been negligible.

As a consequence, when consulting services were established in World War II in the Office of the Surgeon General and in the service commands and the theaters of operations, a certain amount of education was necessary on both sides. Command and staff officers of the Medical Corps of the Regular Army, whose work, in the emergency, was necessarily chiefly administrative, had to learn the functions and the potential value of consultants in the maintenance of professional standards. For their part, the consultants, most of whom had been commissioned from civilian life, had to learn the complexities of their position in the Army and the extreme importance of what might be termed the administrative background of military medicine.

It was not until both the consultants and the Regular Army medical officers had learned—usually by trial and error—to define and comprehend their individual and joint responsibilities that the consultant system achieved real efficiency. Much time and effort would have been saved in World War II if a consultant group had been maintained in the Office of the Surgeon General between the two World Wars. It would also have been helpful if, before any consultants had been appointed, the nature of their duties had been clearly

established in an official publication. For those who were fortunate enough to see it—and many were not—the first official notice of the consultant's functions was contained in TM (War Department Technical Manual) 12-406, Officer Classification, Commissioned and Warrant, dated 30 October 1943. In this manual, under MOS (Military Occupational Specialty) 3117, the duties of a consultant are summed up in the following paragraph:

Renders special professional advice to various headquarters concerning the medical service within the command. Visits various medical installations and advises the staff of their medical services as to methods of diagnosis, treatment, and operations, with special reference to professional improvements and new developments; conducts clinical-pathological conferences on unusual cases; reviews professional aspects of work of medical services; develops methods for training junior medical officers; advises superior officer concerning professional policy on matters pertaining to the practice of internal medicine within the command; transmits professional information and suggestions between subordinate installations and higher echelons.

In the North African and Mediterranean theaters, the medical section, which was a component of AFHQ (Allied Force Headquarters) was always maintained at the theater level. This gave the Surgeon direct access to the theater commander, the chief of staff, and the chiefs of the general and special staff sections; and it facilitated the Surgeon's entrance into all subordinate commands in the theater. The consultants division of the Medical Section, AFHQ, was enabled to coordinate the professional aspects of medicine and surgery in the various echelons of the command more easily than would have been possible had the medical section been placed at the level of the communications zone or the services of supply. As a result of this system, advice on all technical subjects emanated from the highest level in the theater; the various consultants rarely experienced any difficulty in entering subordinate echelons such as the field army, the air forces, or the communications zone; and coordination and correlation of technical subjects between these commands were made relatively easy.

The need for consultants in the professional fields of medicine and surgery was amply demonstrated during World War II. The establishment of a consultants division in the medical sections in oversea theaters of operations freed the Surgeon and his staff officers from perplexities arising in the practice of medicine and surgery and provided the Surgeon with expert advice concerning the care of the sick and wounded. It also provided him with a channel for ascertaining, and putting to the best use, the professional talents of non-Regular Army medical officers. At their peak employment, these officers composed approximately 98 percent of the Medical Corps of the Army.

Professional Functions

Advisory functions.—The functions and duties of a medical consultant are many and varied and in practice are much broader than outlined in TM 12-406. In the first place, the consultant should always remember that he is in an advisory capacity, and that, unless he is directed to do so by the theater

Surgeon, he will be at fault if he descends to operational levels. His prime duty is to keep the Surgeon constantly and accurately informed of the standards of professional care obtaining in the care of the sick. This service cannot be rendered by sitting at a desk in headquarters. The consultant must spend at least two-thirds of his time in the field, observing and studying medical care at all levels, from the aid stations through the general hospitals. He should be familiar with the tactical and other conditions that affect the diagnosis and treatment of disease and govern the evacuation and disposition of patients in all echelons of the command. To accomplish this mission, the consultant must have easy access to all medical installations, and he should be regarded as a friend and advisor to the Surgeon and medical officers of all commands. It should be well understood that the consultant's main interest is improvement in the care of the sick, in order that patients may be returned promptly to duty. The consultant should never assume the functions of, or be regarded as, an inspector.

Administration of professional personnel.—The second important function of the medical consultant is to advise the Surgeon upon personnel changes that may be necessary to insure a high level of professional efficiency. The Surgeon, as a rule, has not had the training, nor has he had the time, to evaluate medical personnel. He must have confidence in the recommendations made by his medical consultant and should do his utmost to support them even though, at times, reluctant commanding officers have to be brought into line. Otherwise, it would be best for the consultant to ask to be relieved of his duties, so essential is this function to his usefulness. For his part, the medical consultant must have accurate knowledge of the professional capabilities of all medical officers directly concerned with the care of the sick. He should have understanding, as well, of officers' personalities and reactions to their environment. An individual may do better work if shifted from a particular situation to one to which he is better adapted. Again, a family problem may lower efficiency and can sometimes be solved or ameliorated by judicious recommendation of leave, rotation, temporary duty, compassionate leave, and other devices. The consultant in medicine should interest himself in the welfare of the medical officers, general duty, MOS 3100, because these are the forgotten men of the Medical Corps, and it is from this group that many of the ward officers on the medical services will ultimately be derived. Finally, it is the duty of the consultant in medicine to direct the Surgeon's attention to meritorious or outstanding services rendered by medical officers.

Professional education.—The consultant in medicine should be the leader in initiating and guiding professional educational programs for the medical officers under his advisory supervision. Through the medium of clearly written circular letters from the Office of the Surgeon, he should keep them constantly advised concerning medical experience within the command and concerning new developments in scientific and clinical medicine in the Zone of Interior. He should see that medical officers receive all the textbooks and

medical journals to which they are entitled, and if he thinks additional publications would broaden their intellectual horizons, he should make the necessary recommendations to the Surgeon. When conditions permit, the consultant should assist in establishing a medical periodical, in which local experiences in the prevention, diagnosis, clinical course, treatment, and other aspects of disease are recorded, for circulation to all medical officers within the command. It is his duty to initiate staff conferences, clinicopathological and X-ray conferences, journal clubs, and other educational programs within hospital installations. He should recommend and assist in the formation of medical societies in the lower echelons and should see that medical meetings are held in which medical officers from all echelons of the command participate. The consultant in medicine, being generally himself a teacher in civilian life, should always revert to this capacity when making ward rounds in any medical installations. He should plan and initiate a program through which medical officers assigned to field service or nonprofessional duties could be rotated to hospital assignments, in order to prevent the professional deterioration that frequently follows too long an absence from professional duties.

Medical research.—Research, having for its aim the better understanding of medical problems and the more efficient care of the sick within the command, should be fostered by the medical consultant. He should not be discouraged if his first efforts in this direction are rebuffed by administrative or commanding officers with the reminder “there is a war on” and the assertion “there is no time for research.” In reply, the consultant should outline the problem clearly and show how, with the resources available within the command, knowledge might be obtained that would benefit the health of the command and save manpower. He should encourage and assist medical officers who have initiated research problems on their own. He should critically correlate and coordinate the various problems in order that the work may progress in an efficient manner. When results are obtained, he should see to it that they are made available to the command and also to the Office of the Surgeon General for wider dissemination. In promoting research within a command, the consultant in medicine should endeavor to secure for it adequate personnel, supplies and equipment. Finally, if the problem appears to warrant extramural aid, he should recommend to the Surgeon that investigators selected by The Surgeon General be sent into the command.

Care of prisoners of war.—The medical care of prisoners of war should be carefully supervised by the consultant in medicine. It is his duty to report to the Surgeon upon the expected needs for professional services in prisoner-of-war compounds and to recommend what should be done to insure an adequate level of medical service among prisoners of war. He should visit such installations and should supervise and advise upon care of the enemy sick. If the latter are under the care of their own medical officers, he should inform these officers of the prevailing theater policies on the treatment of disease and should instruct them in the use of U.S. Army medical supplies. At all times, the consultant in medicine should be on the lookout for violations of the Geneva

conventions in respect to protected enemy personnel, and, if such are noted, he should make strong recommendations to the Surgeon in respect to their correction.

Liaison and Staff Functions

Hospitalization and evacuation.—It is sometimes assumed that the consultant in medicine has little or nothing to contribute to the operational side of the Medical Department. On the contrary, he can offer valuable aid in estimating bed needs, based upon his knowledge of the prevalence of and average duration of hospitalization for current diseases. His opinion is also of value in respect to the ability of any given medical installation to handle overloads of patients. His advice on the triage of sick patients and their assignment to suitable medical installations will be useful to every operations officer. It should be the consultant's function to recommend to the Surgeon the creation of special centers to facilitate and improve treatment. He should also recommend to the Surgeon a plan for the evacuation and disposition of the sick that will meet existing needs and one that will insure uniformity in procedure throughout the command. In the course of actual tactical operations, the consultant in medicine can frequently be of aid to the task force surgeon, by recommending holding policies for the sick. Often through his efforts and influence, a considerable saving in manpower can be effected.

Medical laboratories.—Although laboratory services are under the direction of the preventive medicine service, the consultant in medicine should be cognizant of the functioning of laboratories in all of the medical installations under his supervision. He should carefully check the diagnostic methods being used and the accuracy of the results obtained. If he believes a laboratory service could be improved, he should communicate his views to the preventive medicine officer in the medical section of the headquarters and request the necessary action. The consultant should also ascertain the extent to which the ward officers on medical services rely upon laboratory tests, rather than upon clinical ability in making a diagnosis. If he thinks an excessive amount of laboratory work is being requested, he should recommend proper corrective measures to the chief of the medical service.

Medical supply.—Problems of medical supplies should rarely be the concern of a medical consultant in the U.S. Army. To be sure, local shortages may develop, but these often can be corrected by dropping a friendly word to the officers in charge of medical supplies. The consultant's greatest concern should be the requests made by medical officers for nonstandard supplies, which they have been accustomed to using in civilian practice. It is his duty to instruct medical officers in the use of those preparations found on the Armed Forces supply table. He should constantly keep abreast of all therapeutic advances and make appropriate recommendations to keep the supply table up to date. In addition, he should make all recommendations concerning the acquisition of nonstandard items that are deemed necessary for the proper prosecution of clinical investigations.

Interpersonal relations with the headquarters staff.—The consultant in medicine should not let himself become the headquarters staff or generals' doctor. He should refrain from giving medical advice or attention to his fellow staff officers unless requested to do so by the Surgeon or by the chief of medicine of the general dispensary at his headquarters. First, if he practices medicine at headquarters, he will find it next to impossible not to discuss questions involving medical policy with members of other staffs; such discussions should be left to the Surgeon or his designated representatives. Secondly, his proper work will be constantly interrupted, and his trips away from headquarters curtailed. It should be the policy of the consultant in medicine to refer, politely and in a helpful manner, all questions relating to medical treatment of staff officers to those whose duty it is to practice medicine at a headquarters.

Staff work.—The consultant in medicine should become versed in staff work as rapidly as possible. He should never forget that he functions in an advisory capacity. He should learn the proper channels for communication, should avoid going out of channels, and refrain from any activities that might create the impression he is going over the head of the Surgeon. Staff work is not too difficult if one remembers that every paper should be coordinated with all interested parties within and without the office of the surgeon of the headquarters before it is passed on by the Surgeon. It is also less difficult if one remembers that, as a principle, established channels are the most effective. A properly coordinated staff paper is rarely turned down, if only because it has been agreed to by all concerned before it is presented. The consultant in medicine should be in constant communication with the other consultants, the preventive medicine officer, the supply officer, the personnel officer, and, for that matter, with all other members of his section. Close liaison with other consultants is especially desirable because in matters of broad professional policy a united front is generally irresistible. If the consultant in medicine is functioning in an allied force, he should coordinate his professional work with his opposite allied number and should take every opportunity to visit the medical installations of the ally. At the same time, he should make certain that similar privileges are extended to his allied colleague.

Visits in the field.—When the consultant in medicine is visiting any medical installation, he should visit an appropriate cross section of the patients on the medical service in company with the chief of the medical service. During such visits, he should check on the prevalence of various diseases, diagnostic methods, therapeutic measures, the condition of patients, and the policies in force regarding disposition of patients. It is here, too, that he can do his best teaching—at the bedside of the patient.

The consultant in medicine should remember to observe military courtesy each time he visits a subordinate echelon. After reporting to the office of the surgeon of the unit he is visiting, the consultant should call upon the commanding officer of the echelon or his designated representative and explain in general lay terms the purpose of his visit. This procedure should be repeated



FIGURE 44.—Col. Perrin H. Long, MC, Chief Consultant in Medicine, Medical Section, AFHQ, MTOUSA (formerly NATOUSA).

when the medical consultant leaves the command. Common courtesy demands that he inform the commanding officer of the observations and conclusions made during the tour. When medical installations are visited, the commanding officer or his representative should be seen first and the purpose of the visit should be explained. At the termination of his visit, the medical consultant should discuss with the commanding officer those points, both good and bad, that have been noted. This permits the commanding officer to take such corrective action as may be necessary. It obviates filling out long reports, since no further action need be taken, unless the commanding officer is either unwilling or unable to act upon the recommendations of the consultant. Finally, it is important to remember that the consultant in medicine should allow other consultants, the chiefs of medicine, and the officers working on the medical services a considerable degree of latitude in the performance of their duties, provided they stay within the bounds of the established principles of the practice of medicine. It is only by doing so that the spirit of mutual esteem, which is so necessary for the maintenance of high standards of medical service, can be preserved.

Assignment and Arrival

On 20 November 1942, the Deputy Surgeon, AFHQ, informed Lt. Col. (later Col.) Perrin H. Long, MC, who at that time was the Scientific Liaison

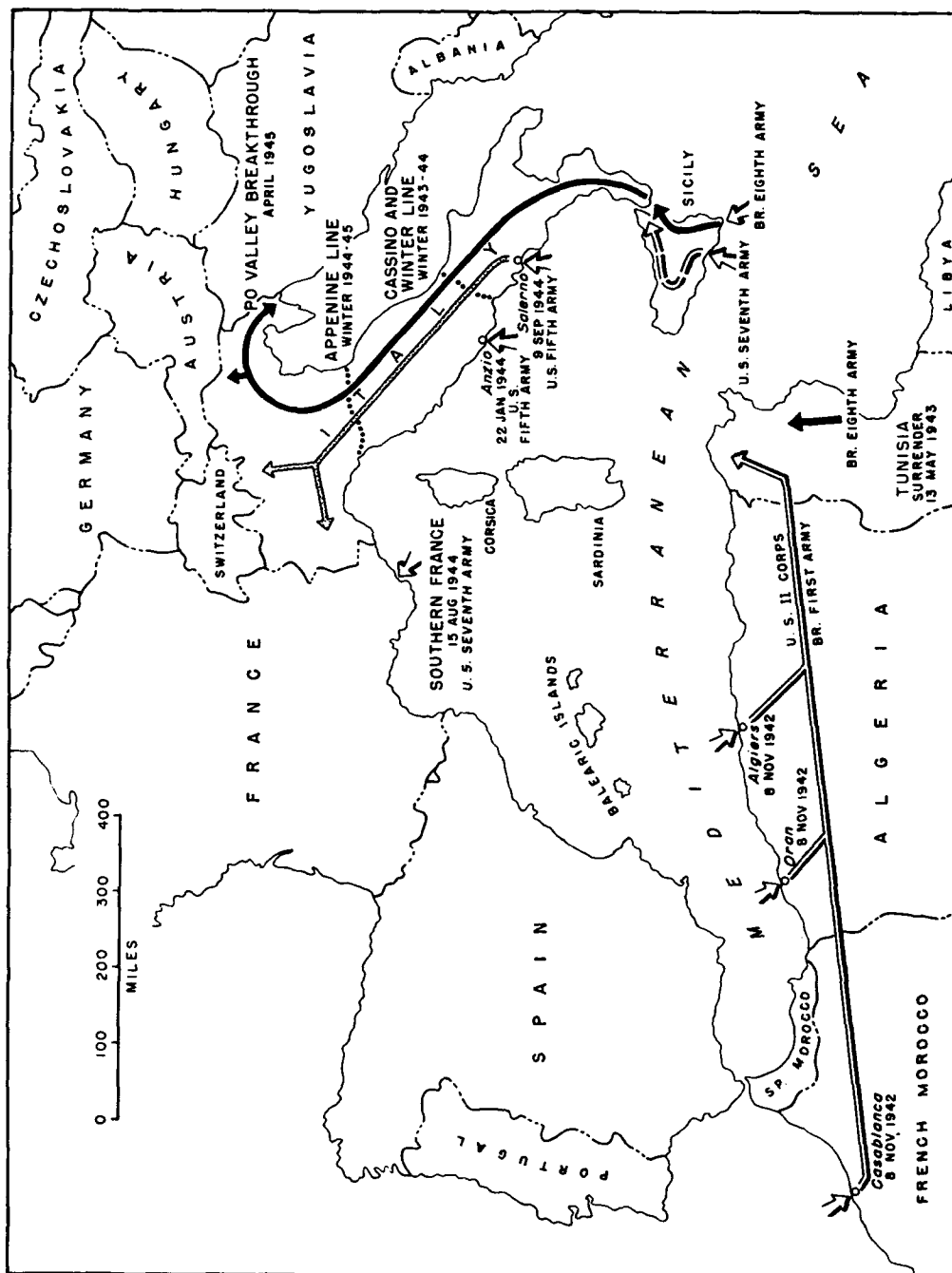
Officer, Office of the Chief Surgeon, ETOUSA (European Theater of Operations, U.S. Army), that he had put in a request to the Chief Surgeon, ETOUSA, for the services of Colonel Long as consultant in medicine (fig. 44) for the American branch of the Medical Section, AFHQ. This request was refused by the Chief Surgeon, ETOUSA, but on 14 December 1942 the following radiogram was received: "C in C directs that Perrin Long Lt. Col., MC, ETOSOS be relieved from present assignment and dispatched by first available transportation and assigned to AFHQ." His new assignment was directed by a letter order dated 17 December 1942, and passage was secured for him in convoy K.M.S., 5, sailing from Glasgow, 26 December 1942, and arriving in Algiers on 3 January 1943. Reporting to AFHQ and being assigned to the medical section, by the authority contained in paragraph 5, Special Orders No. 3, AFHQ, 3 January 1943, he immediately assumed his duties as consultant in medicine.

ORGANIZATION

Allied Force Headquarters was the combined Allied command for all operations in the North African theater and the later Mediterranean theater (map 2).¹ NATOUSA (North African Theater of Operations, U.S. Army) and MTOUSA (Mediterranean Theater of Operations, U.S. Army) staff sections supervised strictly U.S. Army operations within the theater. Operational and tactical control remained with AFHQ. This control was exercised through various task forces, British Army Groups, the Seventh U.S. Army and later the Fifth U.S. Army in Italy.

At its inception as a functioning unit within the theater, the Medical Section, AFHQ, was a completely integrated special staff section because, in the early days (until June 1944), British and American interests were interlocking as regards both tactics and logistics. An officer of the British Army Medical Service (not the Royal Army Medical Corps) was Director of Medical Services and Chief Surgeon, AFHQ. The Deputy Surgeon, AFHQ, was a U.S. Army medical officer. Within the Medical Section, AFHQ, British and American components were divided into a British branch and an American branch. The American branch was allotted five officer spaces, three in the grade of colonel and two in the grade of lieutenant colonel. When the consultant in medicine arrived at AFHQ, on 3 January 1943, this branch consisted of the Deputy Surgeon, AFHQ, and executive, dental, and preventive medicine officers. The consultant in medicine made the fifth officer. In addition, Brig. Gen. (later Maj. Gen.) Albert W. Kenner was assigned to AFHQ as medical inspector, a position from which he reported directly to General

¹ When the Allied forces invaded North Africa on 8 November 1942, the region was, insofar as strictly U.S. elements were concerned, a part of the European theater. NATOUSA was established on 4 February 1943 and included northwestern Africa, Italy, and portions of the Mediterranean Sea. The theater was renamed MTOUSA on 1 November 1944 and expanded to include all of the Mediterranean Sea, Greece, and the Balkan nations. On 20 November 1944, however, base sections in southern France were assigned to the European theater. Early in 1945, MTOUSA was further diminished by assigning its African territory to the Africa-Middle East theater. On 1 October 1945, AFHQ was formally separated from MTOUSA and, for all practical purposes, ceased to function.



MAP 2.—Campaigns in North African and Mediterranean Theaters of Operation, 1942-45.

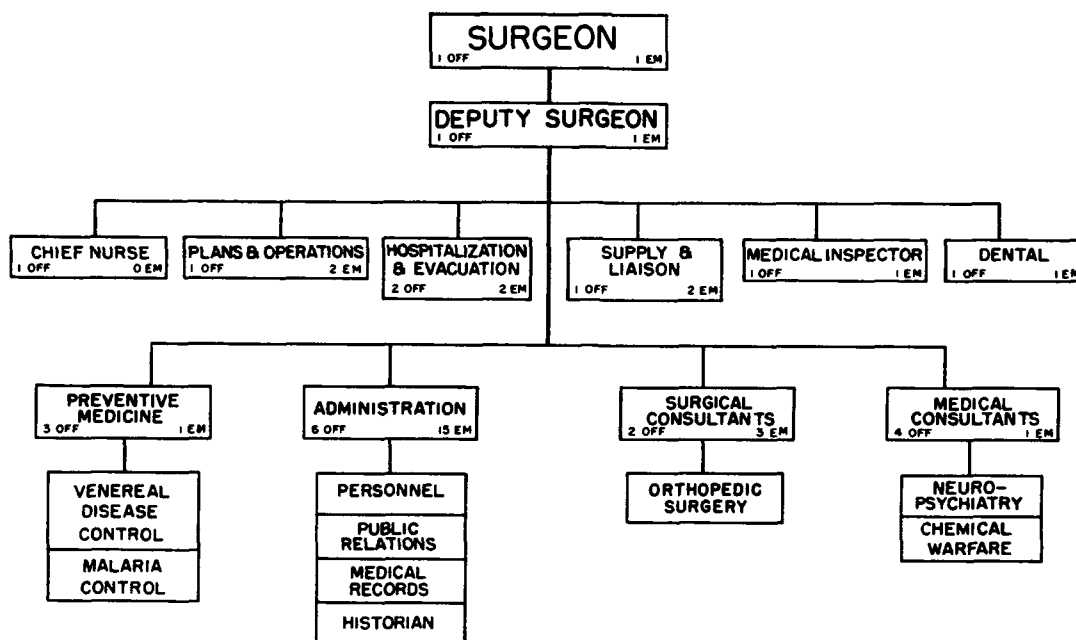
Dwight D. Eisenhower, Commander-in-Chief, Allied Expeditionary Force, without reference to the Director of Medical Services (Chief Surgeon) and the Deputy Surgeon, AFHQ.

Most of the important problems facing the Medical Section, AFHQ, were settled by conferences and committees with representatives of the British and American branches meeting jointly and bringing in recommendations to the Director of Medical Services. The American consultant in medicine, from the earliest period of his assignment to the Medical Section, AFHQ, maintained a constant liaison with his opposite number, the consulting physician in the British branch, Brigadier Edward R. Boland, O.B.E. Throughout the war, the recommendations on professional practices that were made to the Surgeon, NATOUSA, were the joint and coordinated effort of the British consulting physician and the American consultant in medicine.

Later, as the participation and responsibilities of the French increased in the war, representatives from the office of the surgeon of the French Army in North Africa joined in these conferences and committee meetings. Following the invasion of Sicily, the line of demarcation in respect to tactics, logistics, and administration between the two components of the AFHQ began to take form, and, from that time until the war ended, the actions taken by the two branches of the Medical Section, AFHQ, tended to become more unilateral. Hence, with the exception of certain problems involving the control of diseases (such as malaria), joint action resulting from the decisions of Anglo-American committees became increasingly less common.

The Medical Section, NATOUSA, came into existence in February 1943. It was not until sometime later that a table of organization (chart 1) for this section was approved. The Consultants Division, Medical Section, NATOUSA, was purposely restricted to five officers, one each for surgery, medicine, orthopedic surgery, neuropsychiatry, and chemical warfare medicine. The reason for restricting consultant spaces to five officers was based on experience gained in certain other theaters which tended to show that the need for consultants in other medical and surgical specialties, although definitely existent, was not always great enough to require the full-time services of a specialist. Moreover, it was known that a considerable number of affiliated general hospital units were to arrive in the theater, and specialists from these units could be used as consultants on a temporary duty status in the Office of the Surgeon, NATOUSA, for such periods of time as were considered necessary. In the North African, and later the Mediterranean theaters, this approach proved to be sound. Such medical specialties as dermatology, neurology, tuberculosis, and others were adequately supervised in this way without tying up valuable personnel during the periods of relative inactivity common to all theaters. An added advantage was the fresh and enthusiastic outlook of the special consultants, unjaded by periods of inactivity and the petty annoyances of normal administrative routine. No provision was made in the table of organization for a chief of professional services, because it was thought likely that the addition of such an officer would increase administrative detail without

CHART 1.—*Organization of Medical Section, North African Theater of Operations (American Medical Component of AFHQ), August 1943*



(ADAPTED FROM CHART, P.380, ANNUAL REPORT, MEDICAL SECTION, NATOUSA, 1943)

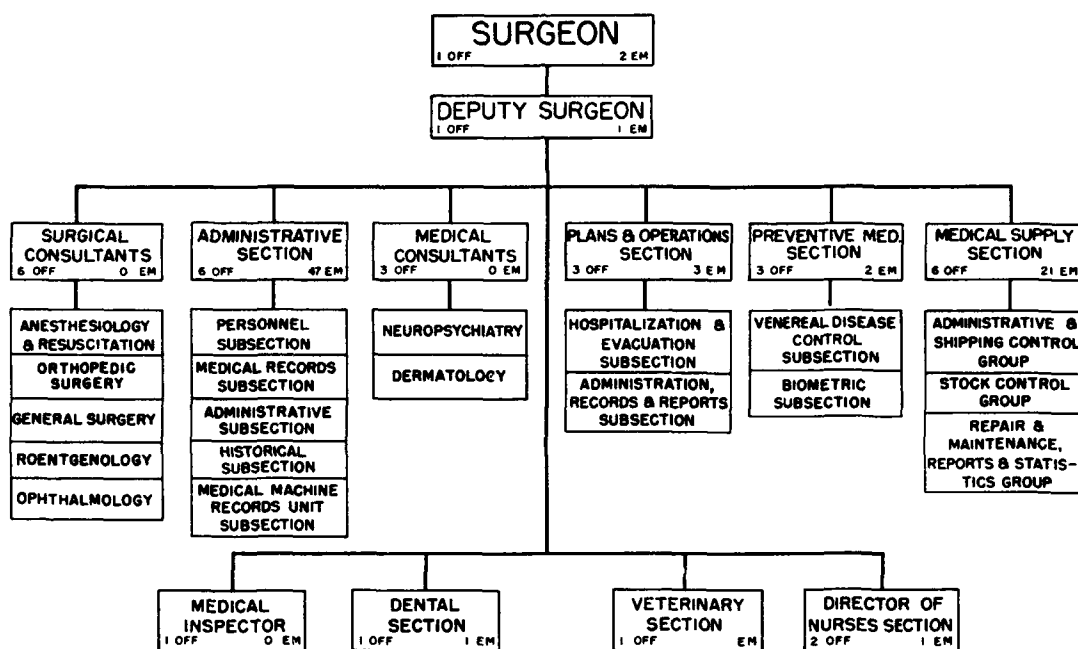
serving any useful purpose. For the best functioning of the division, it was thought that each of the five consultants should have direct access to the Surgeon of the theater.

Officers assigned to the medical sections of NATOUSA and later MTOUSA also were assigned to AFHQ. These officers served in dual capacities. When dealing solely with problems concerning the operations of U.S. Army forces in the theater, they would act in their staff capacity as members of the medical section of NATOUSA or MTOUSA, but when planning, operations, or policy matters required joint action with the British, their staff actions would be carried out as members of the Medical Section, AFHQ.

Initially, an organization entitled "the Service of Supply" existed in NATOUSA, but this organization dealt solely with supplies and had no other service or administrative functions. Later, in February 1944 when the name of Service of Supply was changed to the Communications Zone, it was given true administrative, service, and operational functions over the various base sections, and at that time the American special staff sections at the Allied Force, NATOUSA-MTOUSA level became, in theory, advisory and planning sections with no operational functions.² This resulted in the organization of large general and special staff sections at Communications Zone headquarters, which, at least insofar as the medical section at the theater headquarters level

² The organization of such an intermediate headquarters between theater headquarters and the base sections was necessary to coordinate activities of widely separated base sections in providing logistical support for the opening of a new front in southern France.—J. B. C., Jr.

CHART 2.—*Organization of Medical Section, Mediterranean Theater of Operations (American Medical Component of AFHQ), April 1943*



(ADAPTED FROM CHART, PP 153-55, ADMIN OF THE MED. DEPT. IN THE MTO, BY K. W. MUNDEN, OFF OF SURG, MTOUSA, 10 NOV 45)

was concerned, caused a considerable amount of administrative and operational confusion in problems involving the ground and air forces, and the Communications Zone. NATOUSA was renamed, effective 1 November 1944, MTOUSA, and within the month³ its medical section assumed the functions of the former medical section of the Communications Zone in addition to its theater functions. This reorganization restored to the theater surgeon all the responsibilities he had previously, before February 1944, and added an important new function in the form of a complex supply activity (chart 2). The medical section acting at theater and allied headquarters was now responsible for all medical functions of theaterwide scope.

In late 1944, all the officers then assigned to the Medical Section, MTOUSA were reassigned to AFHQ.

CONSULTANT ACTIVITIES IN VARIOUS TYPES OF MEDICAL INSTALLATIONS

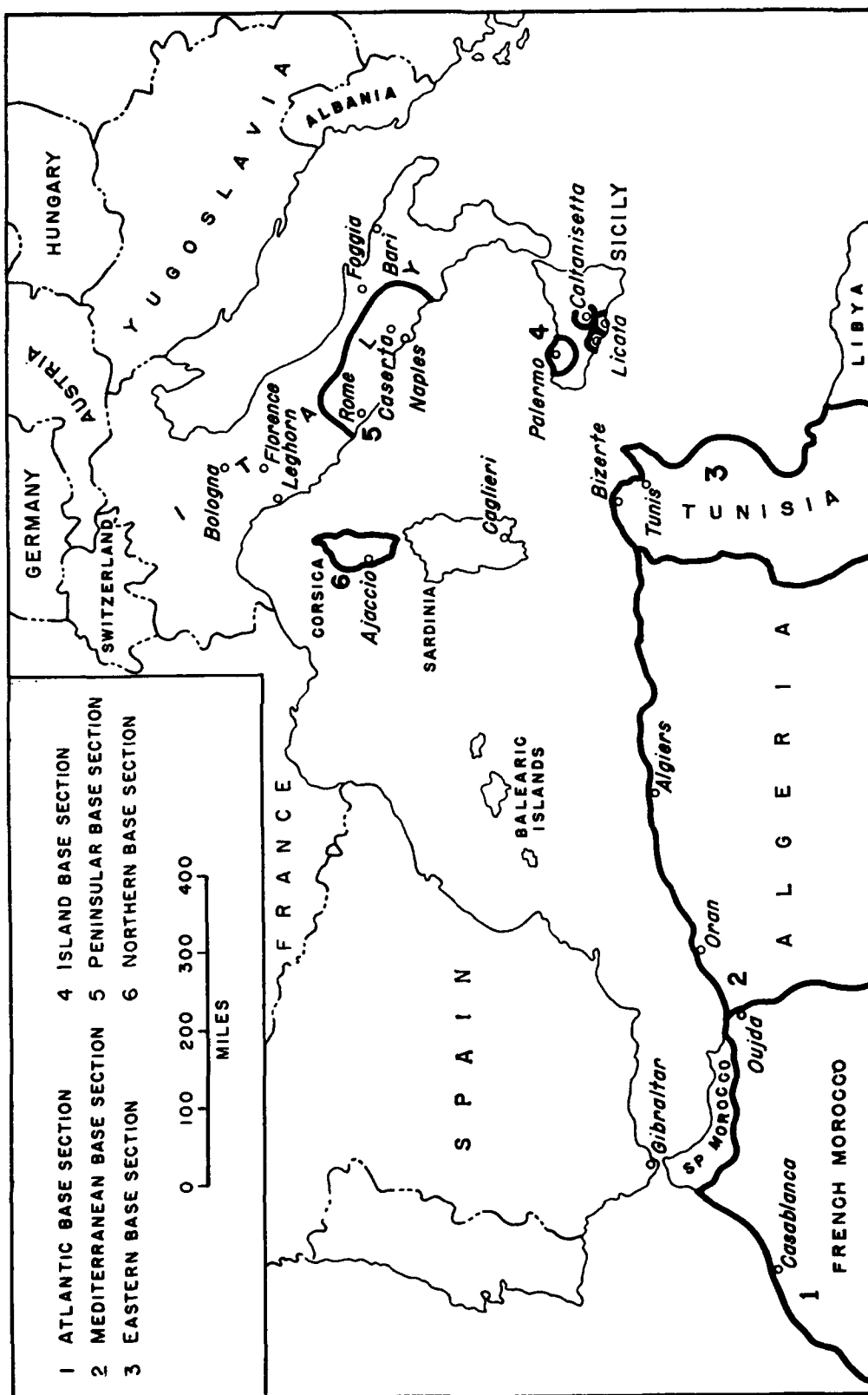
In time of war, and especially in a newly established, active, oversea theater of operations, a medical officer is likely to have many tasks in addition to his assigned duties, and the U.S. Consultant in Medicine, AFHQ, was no

³ The extensive communications zone organization in southern France, consisting of Southern Line of Communications, Continental Advance, and Delta Base Sections, was made a part of ETOUSA. With the loss of this area and the area commands, the Medical Section, Headquarters, MTOUSA, again assumed direct operational control over medical matters in the original base sections that had constituted NATOUSA before preparation began for the invasion of southern France.—J. B. C., Jr.

exception to this rule. Initially, he was the representative of the Deputy Surgeon in all conferences and committees having to do with professional services of all types, and, because of the illness and the subsequent transfer of the preventive medicine officer to the Service of Supply headquarters, he assumed the functions of the officer in charge of venereal disease control for 2 months, those of the preventive medicine officer for 7 months, and those of the theater nutrition officer for 18 months. Summaries of the problems with which he dealt in these other capacities can be found in other volumes of this history.

In the North African and Mediterranean theaters, the function of the consultant in medicine was purely that of an advisor to the Surgeon, except in those rare instances in which, by command, he was placed on an operational or at a command level. His prime duty was to keep the Surgeon constantly and correctly informed of the standards of professional care that were being exercised in the treatment of the sick. In addition, the consultant represented the Surgeon in matters pertaining to the care of the sick, he advised the surgeons of lower echelons in respect to medical problems within their jurisdiction; he prepared circular letters upon the diagnosis, treatment, and disposition of medical patients and prepared other educational matter for medical officers; he supervised the activities of the consultants in neuropsychiatry and chemical warfare medicine; he advised the Surgeon on problems of professional personnel in the Medical Corps; he attempted to stimulate clinical research; he interpreted the policies of the Surgeon to members of the medical staff of the various hospitals in the theater; he considered himself the guardian of all medical officers, general duty, MOS 3100; and he prepared that section of the monthly ETMD (Essential Technical Medical Data) report that dealt with medicine. These duties were accomplished by constantly observing professional work in medical installations and by trying to maintain a continuous contact with medical officers throughout the theater. Because of the shifting nature of operations in the North African and Mediterranean theaters, with the resultant rapid buildups and as rapid deflations of tactical units and base sections, it was not considered expedient to have subsidiary consultants in medicine, except for the Fifth U.S. Army. A consultant was recommended, but not accepted by the surgeon of that command until the closing days of the war in Italy. As a result of this general policy, the theater consultant in medicine was away from his headquarters on tours of visits during 67 percent of the time in 1943, 74 percent in 1944, and 69 percent in the first half of 1945. It was only by being in the field that it was possible for him to fulfill his duties to the Surgeon.

Initially, the activities of Colonel Long, Consultant in Medicine, AFHQ, were limited by the uncertainties surrounding the actual position and powers of the American branch of the Medical Section, AFHQ. This section had been established primarily as a planning and advisory section; the operations of the Medical Department in the theater were to be carried out at the level of the base sections, task forces, and air force. By December 1942, however, it had



MAP 3.—Base Sections, North African Theater of Operations, July 1944.

become clear that the Medical Section, AFHQ, because of its position at the theater level, would have to assume the additional function of coordinating the medical activities of its subordinate echelons. As this naturally meant that the American branch had to enter the field of operations, which the original plan had not envisaged, certain administrative difficulties arose between that section and the medical sections of the lower echelons of command.

This situation created, in turn, certain difficulties for the consultant in medicine. Surgeons of some base sections (map 3) accepted him at once. Considerable education was necessary before the surgeons of other sections fully accepted him or made real use of him. Generally speaking, a period of about 6 months elapsed before the surgeons in the theater understood the duties of the consultant in medicine well enough to permit him to function properly in his assigned mission. It is only fair to add that it also took the consultant in medicine a certain period of time to learn how to function effectively within the framework of the Army in an active theater of operations.

The activities of the consultant in medicine in the North African and Mediterranean theaters were practically always limited to those of an advisory nature because operational and technical command duties were sharply limited, within the medical branch, to the Surgeon and his executive officer. The consultant advised the Surgeon, NATOUSA, and the surgeons of subordinate commands concerning the problems discussed under the various headings that follow.

PERSONNEL MANAGEMENT

One of the most important duties of both medical and surgical consultants was evaluation of medical personnel. Hospital staffs were frequently found professionally unbalanced. Some of them, particularly the affiliated units, had a surplus of talent. Others had been constituted without due regard for their special functions and the ability of their professional staffs to carry them out.

It was the practice of the consultant in medicine to review the professional attainments of medical officers assigned to the medical services of all hospitals as soon as possible after their arrival in the theater. This was done (1) by studying the questionnaires which all medical officers were required to fill out and (2) by interviewing them individually as soon as opportunity permitted.

Assignment and Reassignment of Medical Officers

If glaring errors of assignment had been made in a unit, recommendations for reassignment or transfer were made to the commanding officer immediately. Otherwise, recommendations were withheld until the consultant in medicine had been able to review the professional work of the officers in question after the unit was in operation. Then, if deficiencies were noted, appropriate recommendations were made.

It was sometimes difficult to convince commanding officers of the need for these changes, particularly if the changes involved transferring officers of superior ability to build up weaker units. In the North African theater, the general hospitals were all affiliated units and were therefore rich sources of medical and surgical talent. Officers with such qualifications were seldom relinquished willingly, even when the new assignments might mean promotions and positions of greater responsibility for them.

At the other extreme, although the functions of the consultant in medicine included the making of recommendations for transfers, these changes were sometimes initiated without reference to his opinions and recommendations.

One difficulty which arose in the first days of action in the North African theater was not entirely settled until April 1944. Because of certain command policies in effect within the theater at this time, it was not possible for representatives of the theater Surgeon to interview replacements and unassigned personnel until their completed questionnaires had been received at headquarters. This policy meant that medical officers sometimes remained in replacement pools for a month or more before assignment, a waste of medical manpower which the circumstances of the theater did not warrant.

In a number of instances in 1943, Medical Corps personnel entered the theater and were assigned by G-1, NATOUSA, without reference to the Office of the Theater Surgeon. This difficulty, like the one just described, was not satisfactorily settled until April 1944.

Replacements

In March 1944, a further complication was added when the Communications Zone command took over the personnel services in the base sections in addition to its already existing supply function. Thus, an intermediate echelon was created between AFHQ and base section levels, and, although the Surgeon, Communications Zone was always cooperative in respect to the recommendations of the consultant in medicine, this meant that every contemplated change in Medical Corps personnel that affected base section units had to be coordinated with still another echelon of command. Then too, at this time, because of a shortage of replacements for medical officers in combat units, it was decided that all medical officers in base section units who were under 35 years of age and physically fit were to be made available to the Fifth and Seventh U.S. Armies as needed. The responsibility for making these officers available was given to the Personnel Division, Medical Section, Communications Zone, which was presided over by a nonmedical officer of the Medical Department, who again had had little or no training in personnel problems. This really made things difficult, and this officer had to be watched constantly, because to him a captain in the Medical Corps was a captain, and hence, regardless of whether he had had specialized training or not, was material of which battalion surgeons were made. When chiefs of services or assistant chiefs of services (many of whom were diplomates of American Specialty

Boards) were recommended for transfer to combat units by the personnel section in the Office of the Surgeon, Headquarters, Communications Zone, it was only the vigilance of the consultants that prevented serious dislocation on certain services in general and station hospitals.

In the Fifth U.S. Army, the chief of the personnel section in the Surgeon's Office was a nonmedical officer until after the surrender in Italy, and the philosophy of that office dictated that Medical Corps replacements, no matter how highly qualified they might be professionally, should serve 6 months with combat troops before they could be assigned to hospital units within the Fifth U.S. Army. The extreme example of this type of thinking occurred in the winter of 1944-45, when an officer who was a member of the American Board of Ophthalmology was assigned to a general service combat engineer unit at a time when there was a real need for well-trained ophthalmologists in the evacuation hospitals within Fifth U.S. Army.

In July 1944, Maj. Gen. Morrison C. Stayer, Surgeon, NATOUSA, having surveyed the situation, took the steps necessary to establish central control in his office of the initial assignment of Medical Corps personnel within the base sections and, to a certain degree, within the Fifth U.S. Army. To make this plan effective, he first arranged that all replacements and unassigned medical officers should be concentrated in a replacement depot close to theater headquarters and that his office should be notified by telephone on the day any medical officers arrived at that depot. Then, through the personnel section of his office, arrangements were immediately made for interviews with the newly arrived medical officers. When the professional attainments of these officers had been ascertained, they were promptly assigned by NATOUSA, and later by MTOUSA orders, to existing vacancies in medical installations in the base sections, or they were sent to the Fifth U.S. Army with recommendations respecting the type of duty they could best perform. In effect, with this system placing the initial assignment of these officers in the hands of the consultant staff, there was more chance of their being properly placed on the basis of their professional abilities, and the time they had to remain in the replacement depot was cut from weeks to a matter of a very few days. It might also be added that, following the institution of this system of personnel placement, complaints arising from alleged improper assignments were practically eliminated.

Redeployment

After V-E Day, the Commanding General, MTOUSA, directed that redeployment to the Zone of Interior and the Asiatic-Pacific areas of Medical Corps personnel assigned to hospital units be the responsibility of the Surgeon, MTOUSA. The Surgeon, in turn, delegated it to the consultant staff in his office.

These officers laid down the policy that the seventeen 500-bed station hospitals, the three 400-bed evacuation hospitals, the three field hospitals, and the two general dispensaries that had to be redeployed by MTOUSA would be

staffed with medical officers (1) who possessed the proper MOS; (2) who had demonstrated their ability to fill their new assignments; (3) whose adjusted service ratings were below 85 points; and (4) whose ages, whenever possible, were below 40 years. It was also decided that every opportunity would be given for promotion; this meant that assignments were not made in grade but in one grade below that which was called for in the tables of organization.

Although the theater was short of medical officers—in May 1945, it was operating on a basis of 4.6 medical officers per 1,000 men—it was possible to complete redeployment upon the basis of the criteria just outlined.

Classification and Promotion

One of the outstanding advances in the proper management of Medical Corps officers resulted from War Department Circular No. 232, dated 10 June 1944, which created the graded MOS numbers. As the result of his long service in the North African and Mediterranean theaters, Colonel Long was well aware of the professional qualifications of the majority of medical officers who belonged to field army or base section units. In anticipation of the responsibility for grading medical officers, he had, late in 1944 and early in 1945, interviewed chiefs of medical services of hospitals in the base sections and in the Fifth U.S. Army, as well as the majority of battalion medical officers in the Fifth U.S. Army, for the purpose of reviewing once again the professional attainments of medical officers in MTOUSA. In the actual grading, the status of each medical officer in the theater was reviewed before an MOS was assigned. The consultant in medicine was assisted in this task by Col. Donald S. King, MC, and Col. Marion H. Barker, MC, each of whom had a wide acquaintance with medical officers in the theater. It is a pleasure to be able to state that the Office of the Surgeon received only one request for a change in MOS. In this instance, the purported error had resulted from an improperly filled out questionnaire. There can be little doubt that the possession of an accurate MOS contributed more than any other factor to the proper assignment of individuals during the redeployment period.

In the Mediterranean theater, as in other theaters, the promotion of medical officers was always a problem. The number of vacancies was limited, and the number of medical officers who deserved promotion on the basis of their qualifications and performance was many times the spaces available. It is to the credit of the officers who entered the service from civilian life that, in spite of disappointments and actual injustices in this regard, they did not let them affect the excellence of their work, particularly when, as inevitably happened, less qualified officers sometimes received the promotions which they felt belonged to them or for which they had been recommended. The question of promotions was a problem which the consultant in medicine was never able to solve.

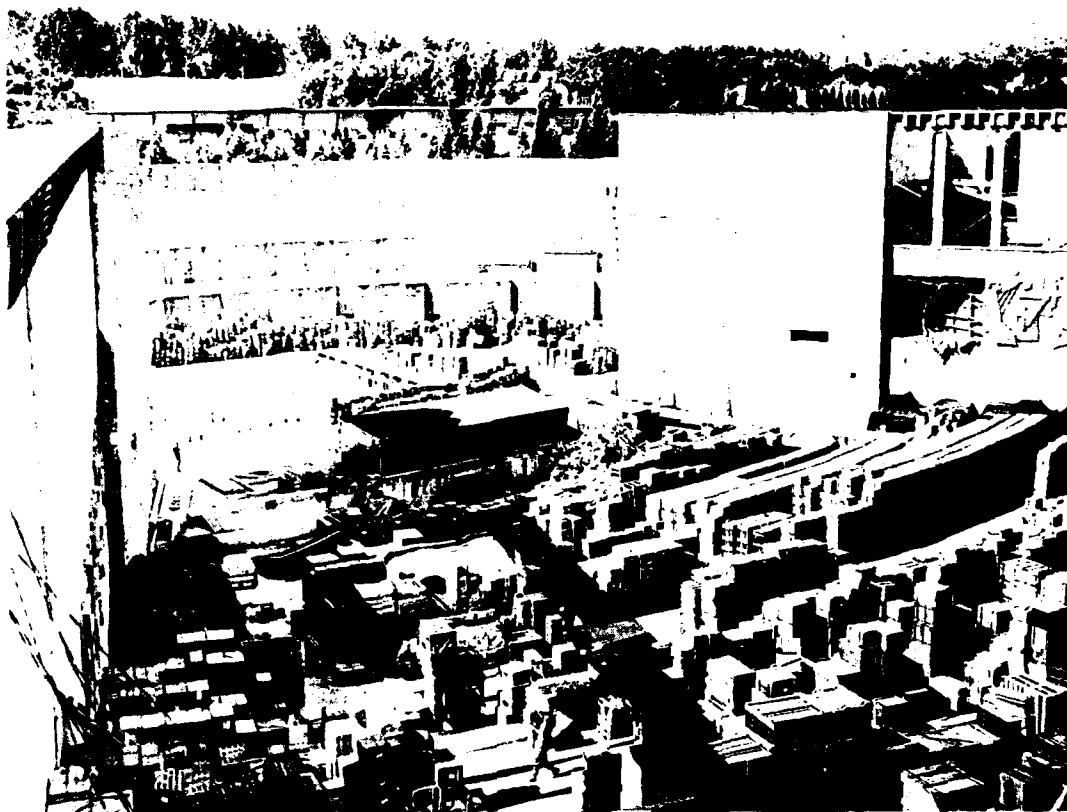


FIGURE 45.—Open storage of medical supplies, Naples, Italy.

MEDICAL SUPPLIES

The U.S. consultant in medicine in the North African and Mediterranean theaters was much more fortunate than his British colleague, in that he rarely had to be concerned with problems of medical supplies. Aside from certain unavoidable local shortages, medical supplies (fig. 45) were always abundant, and the supply officers in the theater were most cooperative in obtaining non-standard items that were deemed desirable for the treatment of patients or for the pursuit of research.

DISEASES OF MEDICAL INTEREST

The problems that arose in the North African and Mediterranean theaters in respect to the management of various diseases will be discussed sequentially.

Neuropsychiatric Casualties

Early in February 1943, the problem of the treatment and disposition of neuropsychiatric battle and nonbattle casualties became pressing. Since December 1942, casualties of this type had been entering British medical installations from the 18th Regimental Combat Team (U.S.), Commando and

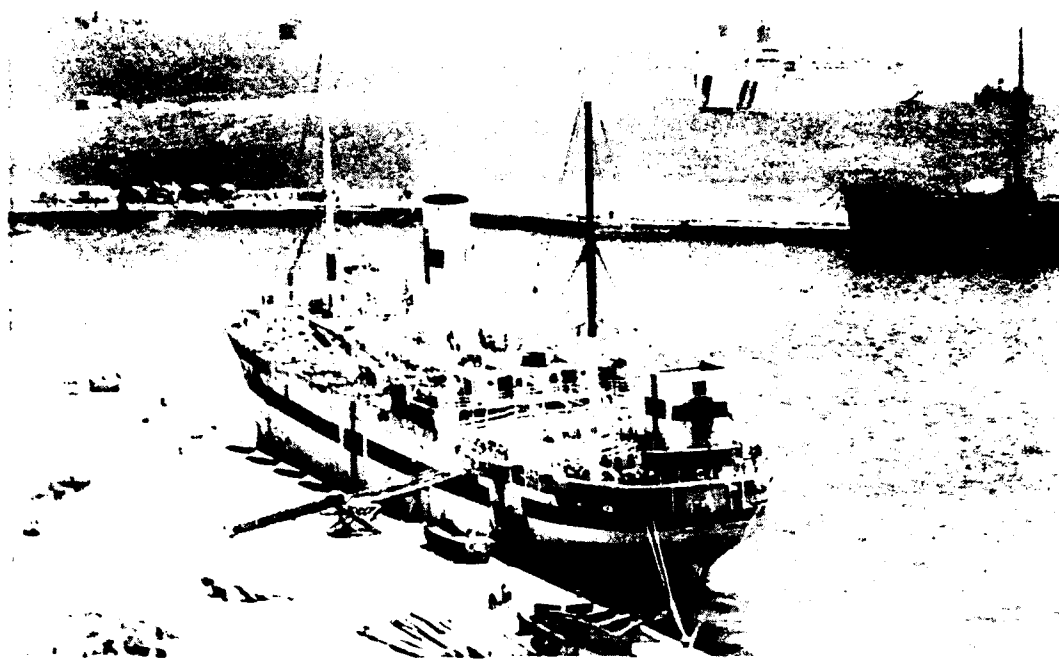


FIGURE 46. British hospital ship in foreground—Algiers, North Africa.

Ranger units. When the II Corps was committed in southern Tunisia, neuropsychiatric patients began to flow into the evacuation and the surgical hospitals assigned to that Corps. Since these hospitals did not have psychiatrists on their staffs, the neuropsychiatric patients were treated on the medical wards. Because medical ward officers lacked knowledge and interest in the management of such patients, the rate of return to duty in the corps area was very low, and most of the patients were evacuated by air to the 95th General Hospital (British) in Algiers or to American hospitals in the Oran area. By the first week in February, the 95th General Hospital (British) was crowded with more than 70 U.S. neuropsychiatric casualties. This group constituted a great additional load upon the already overworked psychiatrist in that institution, and, as this British general hospital did not possess the authority for the final review and disposition of American neuropsychiatric patients, they were steadily accumulating, despite the fact that American casualties were still being evacuated to the United Kingdom in British hospital ships (fig. 46).

At the request of the Director of Medical Services, AFHQ, the consultant in medicine reviewed the situation at the 95th General Hospital (British) and made two recommendations. The first was that a medical disposition board consisting of 2 British and 1 American medical officer be created and be empowered to pass upon the status of American neuropsychiatric patients, while the second dealt with the possibility of attaching an American psychiatrist to the 95th General Hospital (British) for temporary duty. The first recommen-

dation was immediately put into force by the Director of Medical Services, who created a special disposition board of which Maj. (later Col.) Roy R. Grinker, MC, the psychiatrist of the 12th Air Force, was the American member. This board immediately began to function, and it provided a needed mechanism for the disposition of neuropsychiatric patients coming to the rear in the British and American lines of evacuation. Because of a shortage in personnel, it was not possible to attach an American psychiatrist to the 95th General Hospital at that time.

On 12 February 1943, Colonel Long flew down to southern Tunisia at the direction of the Surgeon, NATOUSA, to investigate and make recommendations concerning the treatment and disposition of neuropsychiatric casualties in forward areas. The situation in the forward areas was very interesting. Neuropsychiatric casualties were being treated, without segregation, on the medical wards of the surgical and evacuation hospitals by inexperienced internists. The result was that more gross hysterical and conversion manifestations were developing than were ever noted before or subsequently in forward areas. Hysterical blindness, deafness, aphonia, and gross tics were common and were developing even in individuals who had entered the hospitals with but minor anxiety states. Treatment of these patients was neither individualized nor standardized, and there was ample evidence that the neuropsychiatric disturbances were spreading, in the manner of an infection, to other patients in the medical wards of the hospitals. After spending 6 days in observing the management of these patients and collecting data in respect to them, the consultant in medicine returned to AFHQ and rendered the following report to the Surgeon, on 21 February 1943:

1. This report is based on data obtained from the Medical staff of II Corps, and from interviews with medical officers of the 9th and 77th Evacuation Hospitals.

2. The problem of psychotic, psychoneurotic and anxiety states in the personnel of the A.U.S. in NATOUSA is a real one, and is becoming more acute as relatively new and untried troops are placed on combat duty. Experience in this theater, which is derived from reports of the Center Task Force and II Corps show that when troops are in battle for the first time, a considerable number of psychiatric casualties may be expected. The curve of such casualties is a sharp one which will fall rapidly as troops become acclimated to combat conditions with the exception that a secondary rise in the curve will be noted when troops are kept under battle conditions for long periods of time, as has already happened in this theater (6th Commandos, Inniskilling Fusiliers, etc.).

3. For the sake of convenience, psychiatric conditions can be roughly classified as follows:

a. Psychotic States. Unfortunately, a number of individuals with histories of previous treatment in mental hospitals have been inducted into the Army. These men are having recurrences of their psychoses. The only problem in respect to such individuals is that the nature of their psychosis be promptly recognized by the Medical Officer and the proper disposition made of them. At the present moment, many of these patients are being sent to U.K. This is not desirable because one theater of operations should not throw such a burden upon another. Whenever it is possible, psychotic patients should be sent directly to the U.S.A.

b. Psycho-Neurotic States. The individuals who fall into this classification are those who generally have past histories which show that they were unstable in civilian life. They are the ones of whom it is frequently said, "The Army will make a man out of him."

Unfortunately, the Army has its difficulties in such an endeavor, and has instead, a problem child on its hands. These individuals are especially hard to handle as members of combat units and, in desperation, unit commanders resort to all sorts of subterfuges to get them sent "down the line" with diagnoses of "shell shock," "gastric ulcer," etc. Upon reclassification, a fair number of these individuals will be able to perform some type of base sector duties. However, a certain group will be complete misfits in whatever unit they are placed, and because of their inaptitude or other characteristics should be sent home to be discharged under the provisions of Section VIII [Inaptitude and Undesirable Traits of Character, AR 615-360], if this section is operative in this theater.

c. *Anxiety States.* Personnel suffering from these physiological and psychological disturbances should be the special concern of the Army, because with proper treatment many of them can be promptly rehabilitated for combat duty, and the majority of the remainder will perform well in the Base Sections. Individuals who are suffering from anxiety states rarely give histories of previous difficulties. The factors which produce these states are multiple. Among them are exhaustion, lack of food, equipment or munitions, poor leadership, and extremely difficult, immediate personal tactical situations. Suddenly, when these factors become operative, something happens to an otherwise balanced intellect, and an acute anxiety state is produced. Unfortunately, at the present time, the inception of these disturbances is frequently not being recognized by unit commanders or medical officers and the symptoms progress to become full blown. Then patients are frequently evacuated with a diagnosis of "shell shock" on their Emergency Medical Tag. These patients all read their Emergency Medical Tags sooner or later, and when they see the diagnosis of "shell shock" they have something that they know of, and a fixation of the psychological component of their illness frequently results. Much can be done for this group if the nature of their disturbance is understood and recognized, and the proper treatment is instituted and carried out in forward areas.

d. *Exhaustion States.* These disturbances are primarily physiological in nature, but are frequently misdiagnosed by forward medical officers, and hence, personnel are sent down the line of evacuation improperly labeled as "shell shock," anxiety state, or psychoneurosis. Individuals suffering from exhaustion, in practically every instance, can be treated in the far forward areas and returned to their units within a very short time.

4. *Treatment of Anxiety and Exhaustion States.* At the present time the treatment of these psychological and physiological disturbances in forward areas, frankly is not very good. The reason for this is that many of the Medical Officers who deal with these men really do not understand the nature of the disturbances. Sedation to the point of light anesthesia is considered by many psychiatrists to be the basis for the treatment of anxiety states, and it is not being used. None of the patients are arriving at the surgical or evacuation hospitals completely "knocked out," but instead, they are being given, for example, 1½ grains of ph-nobarbital, 15 grains of sodium bromide or, what is worse, morphine. Hence, with an evacuation line which is long (12 to 18 hours), plenty of time in which a fixed neurosis can develop is being allowed to elapse. The ideal place for the treatment of these patients is in the evacuation hospitals, but there again, owing to the lack of a trained psychiatrist in such installations, the true nature of these disturbances is frequently missed, and improper therapy is instituted. There can be no question but that the addition of a trained psychiatrist to those hospitals would not only be welcome, but also would pay large dividends in facilitating the proper sorting of psychiatric casualties and the proper treatment of anxiety and exhaustion states. As conditions exist at present, psychiatric casualties are spread over the medical wards of the evacuation hospitals, and there is evidence that they are acting as foci of infection for the spread of neuroses to other patients. This is an unhealthy situation.

5. *Availability of Psychiatrists in NATOUA.* According to Major Grinker there is a dearth of trained psychiatrists in this theater. Two are in the 12th Air Force. The 12th and 21st General Hospitals have trained psychiatrists. However, the senior psychiatrist

in the 21st General Hospital has been transferred to the 64th General Hospital. In addition to these men, there are said to be three other psychiatrists in NATOUSA.

6. It is therefore recommended on the basis of the situation as it now exists that:

a. A directive be issued stating that the term "shell shock" shall not be used as a diagnosis and that the term "anxiety state" be the sole diagnosis permitted on Emergency Medical Tag or Field Medical Record of patients who are suffering from the physiological and psychological disturbances described in paragraphs 3c of this report.

b. A psychiatrist be attached to each evacuation hospital, in order that proper sorting and treatment of psychiatric casualties can be carried out and proper instruction can be given to medical officers in battalion aid and clearing stations in the initial handling of these casualties.

c. Psychiatric casualties be segregated from other patients.

d. Sodium Amytal, for intravenous use in sterile 7½ grain ampules, be provided for clearing stations.

e. Five additional trained psychiatrists be assigned to this theater.

The Surgeon, NATOUSA, accepted all of these recommendations. The Surgeon, II Corps, on being queried stated that he would be glad to have psychiatrists in his evacuation hospitals, and Maj. (later Lt. Col.) Louis L. Tureen, MC, and Capt. (later Lt. Col.) Frederick R. Hanson, MC, were assigned to II Corps, with understanding that Captain Hanson would work in the forward areas. This stipulation was made because of the latter's familiarity with actual battle conditions, which he had gained in the course of commando raids and in the landing at Dieppe. On 22 March 1943, Circular Letter No. 4, entitled "Psychotic and Neurotic Patients, Their Management and Disposition," was issued by the Office of the Surgeon, Headquarters, NATOUSA. Before the appearance of this circular letter, supplies of Sodium Amytal (amobarbital sodium) had been made available in all forward areas. Thus, the policy was initiated of treating neuropsychiatric casualties as far forward as possible. The wisdom of this policy was demonstrated during the battles for Maknassy and El Guettar (fig. 47), in the course of which Captain Hanson returned more than 70 percent of 494 neuropsychiatric casualties to combat after 48 hours of treatment, and Major Tureen rapidly rehabilitated the majority of the remainder for duty in the base section.

At the beginning of the battle for northern Tunisia, the consultant in medicine held a conference with the four psychiatrists in the II Corps (two new 400-bed evacuation hospitals having been assigned to the II Corps). As a result of the conference, the II Corps commander, Maj. Gen. (later General) Omar N. Bradley, issued, on 26 April 1943, the following directive on the handling of psychiatric casualties:

1. *Evacuation Policy.*—Psychiatric cases should be evacuated, treated and disposed of as rapidly as possible. The following evacuation policies will prevail for such casualties in hospitals in II Corps:

a. 11th Evacuation—3 days

b. 15th Evacuation—3 days

c. 48th Surgical—3 days

d. 9th Evacuation—7 days



Figure 17. Rocks of La Gruta. Photographed by the author, 23 March 1983.



FIGURE 18. Admission of "exhaustion" casualties to clearing station.

2. *Selection of Cases.*

a. If any or all corps hospitals are acting as clearing stations, the psychiatrist shall be on duty in the receiving room, sorting and labelling psychiatric casualties and seeing that further sedation is given.

b. The following types of psychiatric disorders will be immediately evacuated to E.B.S. [Eastern Base Section]:

- (1) Moderate and severe hysteria.
- (2) Patients with a past history of nervous disorders.
- (3) All psychogenic repeaters.
- (4) All psychoneurotic disorders such as neuro-circulatory asthenia, gastro-intestinal disorders, sustained tics, etc.
- (5) All psychoses.

3. All psychiatric or psychogenic disturbances will be diagnosed as exhaustion in the battalion aid, collecting, or clearing stations (fig. 18). The definitive diagnosis will be made in the evacuation hospitals.

4. *Treatment.*

a. The treatment of all psychiatric casualties in corps area will be under the direction and supervision of the psychiatrist (fig. 19) assigned or attached to the hospital.

b. In general, all psychiatric cases will be segregated for treatment.

c. Insofar as it is possible, patients will be kept under sedation from battalion aid stations to evacuation hospitals.



FIGURE 19. Treatment of neuropsychiatric casualty under supervision of psychiatrist.

d. Specific Therapy. Battalion aid or collecting stations for all psychogenic or psychiatric patients.

1. By mouth. *Initial dose:* Sodium Amytal 6 grains, or phenobarbital 4 grains, or Nembutal $1\frac{1}{2}$ grains.

2. Subsequent dosage should be adjusted to keep patients drowsy. Do not give more than 12 grains of Sodium Amytal, or 6 grains of phenobarbital per 24-hour period in the line of evacuation.

(3. Morphine or codeine will *not* be given to neuropsychiatric patients.

5. *Disposition.* Psychiatric and psychogenic cases should be disposed of as promptly as possible and their disposition will be in the hands of the psychiatrist. They will be sent direct to duty when possible, if not, to the replacement pool with a statement that they must be returned to duty as promptly as possible.

It may be noted that in this directive the term "exhaustion" was introduced for the first time. Of the possible diagnostic terms discussed this word was chosen because it was thought to convey the least implication of a neuropsychiatric disturbance, and probably it came closest to describing the way the patients really felt.

In the campaign in northern Tunisia, the results obtained again were excellent as approximately 70 percent of neuropsychiatric casualties were returned to combat duty within the time periods defined in the directive. One of the prime objectives of treatment in the North African theater was to reduce the period of hospitalization to the minimum consistent with the rational care of the patient. When a neuropsychiatric patient was released from the hospital an attempt was made to assign him to duty as promptly as possible. In the more severe cases, under this system, not all traces of anxiety were lost by the time the patients were assigned new duties in the base sections. It was noted



FIGURE 50.—Brig. Gen. Frederick A. Blessé, Theater Surgeon.

by the consultant in medicine during the spring of 1943 that on many occasions reclassified neuropsychiatric casualties were given duties that frequently, often promptly, resulted in their exposure to enemy air raids. These raids produced a return of the acute symptoms of anxiety in these men, which necessitated further hospitalization. In an effort to define more carefully the types of duty to which reclassified neuropsychiatric casualties should be assigned in the base sections, Colonel Long made the following recommendations to Brig. Gen. Frederick A. Blessé (fig. 50), the Surgeon, NATOUSA, on 1 May 1943:

1. Experience is showing that certain types of neuropsychiatric casualties cannot be returned to combat duty because they quickly deteriorate and have to be evacuated to the rear.
2. Many such casualties when properly reclassified and placed on duty in quiet areas such as the ABS or MBS [Atlantic Base Section or Mediterranean Base Section] are able to fulfill their duties in a satisfactory manner. The use of rehabilitated neuropsychiatric casualties in the quiet base section also obviates the need for a certain number of replacements for such areas.
3. If, however, such rehabilitated casualties are placed in areas such as Algiers, etc., which are subjected to bombing and hence AA fire, many will revert to their neuropsychiatric state after the first bombing. It is therefore plain that such areas are not to be used for the placement of rehabilitated neuropsychiatric casualties.
4. It is therefore recommended that a statement covering the types of and places for duty be prepared and signed by station and general hospital psychiatrists for all rehabilitated neuropsychiatric casualties and that their statements be forwarded to reclassification boards with the request that they be acted upon accordingly. If this plan is carried out more useful work will be gotten out of such individuals and the chance of them repeating their neuropsychiatric syndrome will be greatly lessened.

These recommendations were accepted by the Surgeon, and from that time a conscious attempt was made to assign reclassified neuropsychiatric casualties to duties in quiet areas. Also, during the Tunisian campaign, Captain



FIGURE 51. Regdany swamp, Albiets area, North Africa, 1943.

Hanson made a brilliant record in the return of neuropsychiatric patients to combat duty and in the organization of the psychiatric facilities in the II Corps. Because of this, the consultant in medicine recommended to the Surgeon, NATOUSA, that Captain Hanson be designated as consultant in neuropsychiatry for the North African theater. This suggestion was carried out by the Surgeon early in June 1943, and subsequently the consultant in medicine acted solely in an advisory capacity insofar as neuropsychiatric problems were concerned.

Malaria

It became evident to the consultant in medicine shortly after his arrival in North Africa that, because of the frequency and severity of malaria in that area (fig. 51), special efforts would have to be made to indoctrinate American medical officers in the need for prompt survey, control (fig. 52), diagnosis, and treatment. In Circular Letter No. 6, entitled "Treatment of Malaria," which was issued on 10 April 1943 by the Office of the Surgeon, Headquarters, NATOUSA, the importance of early recognition and treatment (fig. 53), was stressed, and it was recommended that the quinine Atabrine Plasmochin or the Atabrine Plasmochin scheme of therapy be employed. The dosage system recommended was that advised in Circular Letter No. 135, 21 October 1943, Office of the Surgeon General. These methods of treatment were used during



FIGURE 52. Malaria control, Algiers area, North Africa, 1943. A. Italian prisoners of war working on minor clearing and canalization. B. Completed minor canalization for malaria control on stream on Barbe farm.



FIGURE 53. Making a blood smear drawing for early recognition of malaria, Algiers area, North Africa, 1943.

the summer of 1943 with the following average periods of hospitalization: 15 days, aestivo-autumnal malaria; 17.6 days, benign tertian malaria; and 20 days, clinical malaria.

In August, 1943, Colonel Long began to doubt the necessity for the use of Plasmochin (pamaquine naphthoate) in the treatment of malaria in U.S. Army troops in the North African theater. His reasons for this point of view were summed up in the following report, which was made to General Blessé on 2 September 1943:

Plasmochin has very little plasmodicidal effect upon malarial parasites except in the gametocyte stage.

It is the opinion of experienced malariologists in NATOUSA that, as a result of eliminating routine Plasmochin therapy in U.S. troops, adult gametocyte carriers will not increase the present rate of mosquito infection from troop sources.

The reported reduction in malaria relapses in primary cases by use of Plasmochin therapy has not been confirmed.

As Plasmochin is more toxic than Atabrine or quinine and of limited therapeutic value, it should be used only in selected relapsing patients who possess a heavy gametocyte concentration in their blood and who cannot be adequately protected from anopheline mosquitoes. It is recommended that the plan outlined in Circular Letter No. 6, Office of the Surgeon, Hq. NATOUSA, Paragraph 3a(1) for the treatment of uncomplicated malaria be abandoned.

In addition, it was thought that the time required for the hospitalization of malaria patients would be decreased if the use of Plasmochin was discontinued. At the same time, it was recommended that, if Atabrine (quinacrine

hydrochloride) alone was used for the treatment of malaria, the dosage schedule should be changed to 0.2 gm., three times daily, until the temperature was normal, then 0.1 gm., three times daily, after meals for 5 days. This revision was motivated by the desire to build up the concentration of Atabrine in the tissues early in the disease and then, when the infection was known to be under control, to maintain an effective level of the drug over a period of days. The quinine-Atabrine method of treatment was left unchanged, as were also the directions for the parenteral use of quinine or Atabrine in severe forms of malaria. These recommendations were accepted and were published on 3 September 1943 in Circular Letter No. 32, Office of the Surgeon, Headquarters, NATOUSA. On the day after this circular letter was published, reports were received from the National Research Council indicating that Atabrine was as effective, if not more so, in the therapy of malaria than quinine (a conclusion also arrived at in NATOUSA), and giving detailed information concerning the pharmacology of Atabrine. On the basis of these reports and of information received from the Office of the Surgeon General, in addition to theater experience, it was decided to abandon the routine use of quinine and to recommend that Atabrine be used as the drug of choice in the treatment of malaria. This was done in section II, Circular Letter No. 34, issued on 14 September 1943 by the Office of the Surgeon, Headquarters, NATOUSA. In this circular letter, the pharmacology of Atabrine was discussed, and a dosage schedule of 0.2 gm. of Atabrine every 6 hours for 5 doses, followed by 0.1 gm. three times a day after meals for 6 days, was recommended for the treatment of malaria. This method of therapy, which resulted in a reduction in hospitalization required for malaria to an average of 11 days for all cases, was maintained as the method of choice for treating malaria throughout the life of the theater, except that a temporary modification was made in respect to the treatment of relapsing malaria in February 1944.

At this time, a considerable number of patients were being seen with three, four, or more relapses of benign tertian malaria. After consultation with the theater preventive medicine officer and the malariologist, the following suggestions for the treatment and disposition of patients ill with relapsing malaria were published in section III, Circular Letter No. 10, 15 February 1944, Office of the Surgeon, Headquarters, NATOUSA:

Relapsing Malaria

1. Experience has shown that despite various treatment regimes malaria is a disease prone to relapse, especially when the infection is caused entirely or in part by *Plasmodium vivax*. This letter deals with treatment of relapses and disposition of malaria patients to the Zone of the Interior.

2. First and second relapses of malaria should be treated like a primary attack, using the system of therapy outlined in Section II, par. a (1), Circular Letter, No. 34, Office of the Surgeon, Hq. NATOUSA, dated 14 September 1943.

3. Third and subsequent relapses should be treated with quinine according to the following 10-day regime:

- a. Quinine sulfate 1.0 gram (15 grains) by mouth three times daily after meals for the first three days.

b. Quinine sulfate 0.32 gram (5 grains) by mouth three times daily after meals for the next seven days.

4. The use of adrenalin followed by Atabrine or quinine (so-called Ascoli method) is not recommended because its value has not been demonstrated.

5. Every method of adjuvant therapy should be employed as indicated to restore the physical condition of malaria patients. Of special value are:

- a. High caloric, high meat protein diets.
- b. Multivitamin pills or capsules.
- c. Transfusion when patient is very anemic.
- d. Ferrous sulfate in appropriate doses.

6. It is not logical to set up absolute criteria for disposition to the Zone of Interior of personnel who have had one or more attacks of malaria. Some patients are in better physical condition after several relapses than other patients after a primary attack. Patients who develop chronic malarial cachexia, persistent splenomegaly, or recalcitrant anemia should be considered as subjects for evacuation to the Zone of the Interior.

It is to be noted that in this circular letter the use of epinephrine in the treatment of malaria was not recommended—a move to counteract the influence of the teachings of Ascoli—and that a policy for the disposition of patients ill with relapsing malaria was established. That part of Circular Letter No. 10 that dealt with the use of quinine in the treatment of relapsing malaria was rescinded in paragraph 4c, Circular Letter No. 41, 29 July 1944, Office of the Surgeon, Headquarters, NATOUSA, after it became apparent that therapy with quinine did not alter the rate of relapse in malaria. In Circular Letter No. 41, the importance of the physical rehabilitation of malarial patients was again stressed, and a directive that all patients convalescent from relapsing malaria should receive 0.1 gm. of Atabrine daily, for 7 days a week, regardless of whether they were in a "safe" or "dangerous" area, was issued. No other changes in policy for the treatment or disposition of cases of malaria were made until after the surrender of the enemy in Italy in May 1944, when it was recommended verbally by the Surgeon, MTOUSA, that patients suffering from frequently relapsing malaria should be sent to the Zone of Interior.

Dysentery

The threat of dysentery—both bacillary and amebic—seemed great in the early part of 1943. As a result of the recommendations made by Colonel Long, Circular Letter No. 9 was issued on 6 April 1943 by the Office of the Surgeon, Headquarters, NATOUSA. Diagnosis and treatment were discussed in this directive. The highpoints of this circular letter were the recommendations that sulfaguanidine was the drug of choice for the treatment of bacillary dysentery and that the course of emetine hydrochloride to be used in the therapy of amebic dysentery should be of 10 days' duration, rather than the customary 6 days. This latter recommendation was made upon the advice of the British consulting physician, who had had an extensive experience in the treatment of amebic dysentery in soldiers in Egypt. It is believed that the wisdom of this advice was borne out by the experience of the theater.

In September 1943, in paragraph VIIb of Circular Letter No. 34, the more extensive use of sulfadiazine for the treatment of bacillary dysentery was advocated, and, in paragraph III.a(1) of Circular Letter No. 24, 15 April 1944, Office of the Surgeon, Headquarters, NATOUSA, it was stated that for the treatment of bacillary dysentery "sulfadiazine is the drug of choice with sulfaguanidine and sulfathiazole following in the order named." This recommendation was made because, under the conditions existing in the theater, it had been found that sulfadiazine was an effective, practical drug. The inference that it was therapeutically superior to sulfaguanidine in the treatment of bacillary dysentery could not be drawn, as both appeared to be equally effective, but sulfadiazine was easier to administer to patients because of the smaller doses and less frequent dosage periods required for its use.

In the spring of 1944, during the offensive from the Hitler to the Gothic Line, the hospitals in Italy were very busy, and it became common practice to discharge from hospitals patients suffering from amebiasis, with instructions to take a second course of carbasone while on a duty status. As a consequence, the second course of carbasone frequently was not completed, and relapses often occurred. In paragraph 3 of Circular Letter No. 41, 29 July 1944, Office of the Surgeon, Headquarters, NATOUSA, this practice was condemned, and instructions were given that all patients suffering from amebic dysentery should remain hospitalized until their treatment had been completed. It is unfortunate that a true evaluation of the effects of the recommended therapy for amebic dysentery in the North African and Mediterranean theaters could not be made because adequate diagnostic criteria for the disease could not be formulated, and relapses frequently could not be distinguished from possible reinfections. Curiously enough, probably because of good sanitation, amebic infection was never a real problem in NATOUSA or MTOUSA.

Poliomyelitis

In the summer and fall of 1943, 1944, and 1945, the question arose concerning the treatment and disposition of patients suffering from acute anterior poliomyelitis. The policy in respect to the treatment of such patients, based upon the recommendations made by the Conference on Poliomyelitis of the National Research Council—which did not recommend the Kenny Treatment—was laid down in Circular Letter No. 42, 1 November 1943, Office of the Surgeon, Headquarters, NATOUSA. Standard Drinker respirators were not requisitioned by the theater, because these could be borrowed from the British, and patients with paralysis that persisted after the acute phase of the disease were evacuated to the United States.

Infectious Hepatitis

The epidemic of infectious hepatitis, which began in August 1943 and mounted rapidly to its peak in November of that year, caught the North

African theater in a state of intellectual and physical unreadiness. All medical officers were familiar with a disease called catarrhal jaundice, which in their clinical experience had been essentially a mild disease occurring, without sequelae, in children and young adults. It was difficult for them to comprehend what was happening—and this was true of others who did not witness the epidemic—when, within 4 months, more than 14,000 cases of hepatitis were admitted to hospitals. They sought aid from their textbooks, from their elders, and from their consultant in medicine, to little avail, because this was something new in the experience of most medical officers. To be sure, a number of them had witnessed numerous cases of jaundice following vaccination against yellow fever in 1942, but this naturally occurring disease appeared to be different. Also, none of the medical officers, with possibly two exceptions in the theater, had followed their cases of hepatitis in 1942, with the numerous correlations that are so necessary if the clinical picture of a disease is to be obtained. Thus, the fall of 1943 can be considered as a period in which medical officers began to learn about infectious hepatitis at the bedside.

It was also a difficult period for the patients, because with the successful assault on Italy, many hospitals moved from North Africa to Italy, where it took time to set up these installations, with the result that there was a constant pressure upon medical officers to return patients to duty in order that beds might be made available for additional sick and wounded flowing into the base from the Army Air Forces and the Fifth U.S. Army. At the same time, the B ration had become badly unbalanced owing to the substitutions and eliminations always made in that ration during periods of stress. The total situation was difficult—medical officers were dealing with a disease about which little was known, hospitals beds were at a premium, and the hospital ration was unbalanced. In the course of a tour of inspection of hospitals in PBS (Peninsular Base Section) and the Fifth U.S. Army made in December 1943, Colonel Long noted that marked variations existed in the therapy, period of hospitalization, and disposition of patients ill with hepatitis. There was no unanimity of opinion among medical officers concerning the management of the disease, and it appeared that unless action was initiated, a chance to make a fundamental contribution in respect to management would be lost. The Surgeon, Peninsular Base Section, requested the assistance of the consultant in medicine with this problem. The latter recommended that, as soon as the 12th General Hospital arrived in Naples, Colonel Barker be given the task of assembling pertinent information concerning the diagnosis, treatment, and disposition of patients suffering from infectious hepatitis. This recommendation was made because it was known that Colonel Barker had studied the hepatitis that followed vaccination against yellow fever in 1942 at Camp Custer, Mich. Colonel Barker began his work early in 1944 and obtained enough information to permit the consultant in medicine to make

the following report to the Surgeon, Peninsular Base Section, on 1 March 1944:

* * * * *

2. Within the past few weeks, recurrences of hepatitis with and without jaundice, which are marked by anorexia, dyspepsia, fatigue, or enlarged, painful or tender liver, have become increasingly frequent. These recurrent manifestations of hepatitis are very similar to those noted in the course of the epidemic of hepatitis which followed inoculation with certain lots of yellow fever vaccine. To date, however, the severe instances of the disease marked by a rapidly progressing cirrhosis of the liver with ascites have been rare. Thus, it has become clear that in the present outbreak of hepatitis, the sequelae which marked the jaundice following the yellow fever inoculation are being repeated.

3. It is impossible to state exactly how much of a role insufficient hospitalization and convalescent care play in the production of the recurrences or relapses of hepatitis because adequate data upon this point are not available. However, evidence is accumulating which shows that many cases of hepatitis appear to be discharged from hospitals, convalescent sections, and even from personnel centers before the disease is completely arrested and as a result of these premature dispositions, recurrences or relapses of the disease are occurring.

4. If experience repeats itself, recurring waves of hepatitis with and without jaundice may be expected in this theater until troop dispersal is effected after the cessation of hostilities. It is therefore necessary to enunciate as promptly as possible, those criteria which will enable medical officers to dispose of cases of hepatitis as efficiently as possible in order that a maximum of fit individuals be returned to duty. However, absolute criteria for making efficient dispositions are still in the experimental stage and a final answer awaits the accumulation of experimental data. However, certain observations have been made which are helpful in determining the physical status of patients who have been ill with hepatitis. These are:

a. Freedom from clinical jaundice with an icterus index which is within normal limits.
b. The absence of signs of anorexia, dyspepsia, or food intolerance when the patient is placed upon the expeditionary force 'B' ration.

c. Lack of fatigue at the end of the day, and the absence of any liver enlargement, pain, or tenderness late in the afternoon after the patient has been up all day. The enlargement must be determined with the patient in the *upright position*, and the tenderness can best be elicited by a light quick blow with the doubled fist applied just below the costal margin in the right anterior axillary line.

d. Work and exercise tolerance must be adequate and not produce jaundice, dyspepsia, liver enlargement, pain or tenderness. This is best determined by putting patients convalescing from hepatitis through a graduated series of exercises followed immediately after each exercise or work period by careful observation for the appearance of jaundice, anorexia, dyspepsia, undue fatigue, or enlarged, painful, or tender livers.

5. Patients suffering from hepatitis with or without jaundice who show a persistence of jaundice, anorexia and dyspepsia, undue fatigue or enlarged, painful or tender livers should be evacuated from field, station, and convalescent hospitals to general hospitals for further observation, treatment and disposition. All such cases and all recurrent or relapsing cases of hepatitis should be carefully observed according to the suggested schedule as outlined above, and if jaundice or dyspepsia persists or work and exercise tolerance tests do not show a progressive improvement, and the liver continues to become large, painful or tender, then such patients should be carefully considered by the medical disposition boards of general hospitals as candidates for evacuation to the Zone of the Interior.

6. In order to facilitate the efficient handling of patients suffering from hepatitis, the following recommendations are made to The Surgeon, Peninsular Base Section:

a. That a Surgeon's Circular upon the subject of hepatitis, compiled by Lieutenant Colonel Marion Barker and the Consultant in Medicine NATOUA, be issued immediately to all medical officers in PBS.



FIGURE 54. 23d General Hospital situated between Bagnoli and Naples, Italy.

b. That Major Richard Capps be placed on temporary duty with the authority to visit all hospital installations in PBS for the purpose of educating medical officers on medical services of the hospitals in procedures which are of proven value in assisting medical officers to arrive at correct decisions concerning the disposition of patients suffering from hepatitis.

c. That every facility be given Lieutenant Colonel Barker in the prosecution of his investigation upon accurate functional tests for the diagnosis, evaluation and disposition of patients suffering from hepatitis and in order to hasten his investigations, that fifty (50) beds be allotted for new cases of suspected or actual hepatitis in the 225th Station Hospital, while all recurrences or relapses and protracted instances of jaundice, dyspepsia, or enlarged painful or tender livers (hepatitis) will be routed to the 21st, 23d (fig. 54), or 45th General Hospitals after Monday, the 6th of March, 1944. This last could be made effective by a memorandum to commanding officers of PBS hospitals at The Surgeon's conference on March 6th.

The recommendations contained in this report were accepted by the Surgeon, Peninsular Base Section, with minor modifications, such as the suggestion that the proposed circular letter be issued by the Surgeon, NATOUSA, and that all investigative work be carried out in the 182d Station Hospital, in which 100 beds were allotted for the study. Thus, in March 1944, a concentrated attack on the disease was initiated under the general supervision of Colonel Barker, who was assisted by Lt. Col. Ross L. Gauld, MC, and Lt. Col. Harold H. Golz, MC, Maj. (later Lt. Col.) Richard B. Capps, MC, and, as the program developed, by many other medical officers in the theater. On 28 March 1944, Circular Letter No. 19, subject: Infectious Hepatitis, was issued by the Office of the Surgeon, Headquarters, NATOUSA.

Circular Letter No. 19 was rescinded by Circular Letter No. 37, which was issued on 8 July 1944 from the Office of the Surgeon, Headquarters.

NATOUA. This circular letter brought up to date the available information in respect to infectious hepatitis and stressed the therapeutic effects of a high-protein, low-fat, high-carbohydrate diet. Circular Letter No. 37 drew severe criticism from certain officers of the Medical Consultants Division, Office of the Surgeon General, because of their disbelief in the existence of certain of the clinical types of the disease that had been described, their disagreement with the diagnostic criteria that had been established their dislike of the method of treatment that had been prescribed, and finally their fear that the regime employed in the treatment of these patients would produce psychoneurotics. That these criticisms were unjustified was demonstrated by the record of the theater in respect to the diagnosis, treatment, and disposition of patients with infectious hepatitis.

In the fall and early winter of 1944, hepatitis again became epidemic in **MTOUA.** This time, the air force and base section troops came off almost unscathed, and the bulk of the cases were reported from the infantry units of the Fifth U.S. Army. This outbreak provided another excellent opportunity for the study of the disease. Important contributions were made by medical officers in respect to the value of the various tests of liver function in early diagnosis; the importance of using the high-protein, low-fat, high-carbohydrate diet was confirmed; the necessity of using the exercise-tolerance test for establishing cure was reaffirmed; and important pathological studies were made by Maj. Thomas N. Horan, MC, Lt. Col. Tracy B. Mallory, MC, and Capt. Leslie S. Jolliffe, MC. These investigators utilized the peritoneoscope for obtaining biopsies of the liver in various stages of the disease. It can be said without hesitation that the management of cases of hepatitis during the fall and winter of 1944-45 was infinitely superior to that of the previous winter. The total experience of the theater regarding the diagnosis, treatment, and disposition of patients ill with infectious hepatitis was summed up in Circular Letter No. 21, issued on 20 June 1945, by the Office of the Surgeon, Headquarters, **MTOUA**, subject: Infectious Hepatitis.

Diphtheria

Although diphtheria never became epidemic in the theater, it always caused concern because of the relative unfamiliarity of most U.S. practitioners with the disease in young adults and because deaths from diphtheria were always tragic and avoidable. Circular Letter No. 37, issued on 2 October 1943, by the Office of the Surgeon, Headquarters, **NATOUA**, stressed the importance of the early diagnosis and treatment of diphtheria. In this letter, the use of large doses (from 50,000 to 250,000 units) of antitoxin was recommended, and the necessity for keeping soldiers ill with diphtheria in bed for considerable periods of time (from 2 to 4 weeks or more) was indicated. These injunctions were based upon realization that the definitive treatment of the disease in soldiers would probably occur at a later period than in civilian patients. With the apparent demonstration within the theater that therapy with penicillin



FIGURE 55. Winter in Italy, 1943



FIGURE 56. Trenchfoot, Fifth U.S. Army, 1943.

was of some value in eliminating *Cornibacterium diphtheriae* from the throats of carriers, the therapeutic use of this antibiotic in conjunction with large doses of antitoxin was recommended in section II, Circular Letter No. 51, dated 19 October 1944, Office of the Surgeon, Headquarters, NATOUSA. Although attempts were made to assess the value of the combined therapy, it was impossible to arrive at any definite conclusion.

Trenchfoot

In the late fall and winter of 1943 (fig. 55), conditions of climate and terrain were such in the area opposite the Hitler Line, to the north of the Volturno River, that about 6,000 cases of trenchfoot occurred in the Fifth U.S. Army (fig. 56).¹ For reasons unknown, the disease was considered a surgical rather than a medical emergency, and the advice of the consultant in medicine was not asked until February 1944. At that time, the Surgeon, Peninsular Base Section, was confronted with the problem of what to do with several thousand individuals who had had trenchfoot of varying degrees of severity. Unwisely, an attempt had been made to send some of these men back to combat duty, but, as the same conditions that had produced the injury prevailed, relapses of trenchfoot occurred. In a report made to the Surgeon, Peninsular Base Section, on 2 March 1944, the consultant in medicine gave the following advice, which was accepted:

The solution of the problem is relatively simple. With the return of the feet apparently to a normal condition these men should be sent to personnel centers where they should be

¹ A detailed discussion of the serious losses which occurred from cold injury among U. S. Army personnel in World War II appears in Medical Department, United States Army, Cold Injury, General Type, Washington, U. S. Government Printing Office, 1948.

organized immediately into separate battalions and then a gradual process of conditioning for combat should be instituted. The only *care* which must be taken in this program is *that it be gradual*, that during the next six weeks these men must not be exposed to freezing or near freezing weather under conditions in which their feet *will be damp or wet*, and their feet *must be kept dry* and warm. It might be advisable to have two medical officers, one experienced in the treatment of "Trench Foot" and one in orthopedic surgery attached to these battalions during the training period. It would seem quite certain that if this program could be activated immediately, a considerable group of experienced veterans would be ready for combat by 15th of April, 1944.

During the late spring and early summer of 1944, certain incapacitating late sequelae of trenchfoot were noted, and, in Circular Letter No. 41, 29 July 1944, Office of the Surgeon, Headquarters, NATOUSA, it was recommended that patients showing the following signs should either be placed on limited duties or be evacuated to the Zone of Interior:

- * * * * * *
- (1) Pain and swelling of the feet after walking short distances.
 - (2) Loss of cornified epithelium on the soles, resulting in tender "tissue paper" skin which is very prone to blister.
 - (3) Hyperhidrosis with vasomotor changes.
 - (4) High rate of epidermophyton infection.
 - (5) Atrophy of the subcutaneous [tissues] and muscles of the feet which results in an acute breakdown of the transverse and longitudinal arches and which at times is so marked that shoes of smaller size may be required.

Early in the fall of 1944, a conference was held with the Surgeon, Peninsular Base Section, the theater consultant in surgery, and certain interested medical officers upon the subject of trenchfoot. The recommendations made by this group, after being coordinated with the Surgeon, Fifth U.S. Army, were incorporated in Circular Letter No. 2, issued on 2 January 1945, by the Office of the Surgeon, Headquarters, MTOUSA. They read as follows:

- * * * * * *
4. The management of "trench foot" in the first echelon:
 - a. Unless actual gangrene or a superimposed clinical infection requiring immediate surgical care is found, all patients suffering from "trench foot" should be sent to the medical services of first echelon hospital units. [Evacuation and Field Hospitals].

- * * * * * *
5. The management of "trench foot" in the second echelon:
 - a. Patients suffering from "trench foot" sufficiently severe to require evacuation to the second echelon usually should be treated in general hospitals. Patients will be admitted to the surgical service in the second echelon hospitals upon presence of gangrene or infection for which surgical treatment is necessary. Otherwise, they will be sent to the medical service of these hospitals.

- * * * * * *
6. The proper disposition of patients suffering from "trench foot" should be a matter of primary concern to the disposition boards in station and general hospitals of the second echelon. *It must be remembered that while it is the primary duty of the Medical Department to maintain [conserve] manpower, patients sent back to general or limited assignments must be able to perform the duties recommended by the Medical Corps. It is of little value to send back a man who will promptly become a physical liability to a service or combat unit.* Hence, the case

of each patient must be strictly individualized by disposition boards, and the type of duty recommended be based upon the known fact that a patient who has suffered from "trench foot" is very susceptible to cold and wet and may be unable to march or stand for periods of time without producing a return of symptoms. Therefore, the following broad criteria are suggested for the disposition of these patients:

a. General Duty. The patient must be able to pass an exercise tolerance test similar to that outlined for hepatitis in Circular Letter Number 37, Office of the Surgeon, Headquarters NATOUSA, dated 8 July 1944. The skin of the feet should be normal, free from lesions or loss of subcutaneous tissue, and anesthesia, paresthesia or marked hyperhidrosis should not be present.

b. Limited Assignment. The patient should be able to stand a two mile walk or two hours on guard duty. The skin of the feet should be normal, free from infection or loss of subcutaneous tissue, and anesthesia, paresthesia or hyperhidrosis should not be present. In recommending the patient for limited assignment it should be stressed that he should be kept away from the cold and wet.

c. Patients not falling into the two categories mentioned above, should be considered individually as possible candidates for evacuation to the Zone of the Interior.

Fortunately, owing to the provision of more suitable footwear and to the static nature of the tactical situation in the northern Apennines during the winter of 1944-45, trenchfoot was not the problem that it had been the previous winter.

Sandfly Fever

A minor, though real problem encountered by Colonel Long during 1943-44 was the hesitancy of medical officers in making the diagnosis of sandfly fever. In the summer of 1943, this disease was prevalent in Tunisia and Sicily and, later, on the Salerno beachhead. Despite the fact that the clinical picture was clear cut, the diagnosis of sandfly fever was made in only a small fraction of a percent of the total cases, with the result that FUO (fever of undetermined origin) was reported to a degree entirely out of proportion to its actual occurrence. This situation resulted from an unfamiliarity with the disease, from lack of a diagnostic test for it, and from intellectual laziness on the part of medical officers. Despite an intensive education campaign carried out in 1943-44, it may be said that it was not until the summer of 1945 that the reporting of sandfly fever became satisfactory.

Tuberculosis

Late in 1943, the 46th General Hospital, Mediterranean Base Section, the 6th General Hospital, Atlantic Base Section, the 24th General Hospital, Eastern Base Section, and later, early in 1944, the 17th General Hospital, Peninsular Base Section, and the 26th General Hospital, Adriatic Base Section, were designated as centers for the diagnosis, reception, treatment, and disposition of patients suffering from tuberculosis. This plan of hospitalization was originally recommended because Colonel Long believed, on the basis of his observations in station and general hospitals, that the diagnosis, treatment, and disposition of tuberculosis patients was not being very well managed because of a lack of knowledge of the disease and lack of interest, once the

diagnosis had been made, on the part of most medical officers. During the latter part of 1943, these centers, especially the one in the Mediterranean Base Section, functioned well, but owing to a lack of understanding on the part of medical officers in other hospitals of the fundamental purposes of these centers, they did not reach high standards of efficiency until the following memorandum dealing with their function was published, at first locally in the Peninsular Base Section, June 1944, and later in Circular Letter No. 41, Office of the Surgeon, NATOUSA, 29 July 1944:

* * * * *

a. All patients suffering from active tuberculosis will be sent from other hospitals to the general hospitals which have been designated as "tuberculosis reception centers" as soon as the diagnosis of active tuberculosis is made. The "tuberculosis reception centers" will manage and dispose of all patients suffering from active tuberculosis.

b. All patients in whom the activity of a recent or old tuberculosis is a matter of doubt will be sent to a "tuberculosis reception center" for an evaluation of their status, and if follow-up checks are desirable, patients with doubtful lesions will be returned to a "tuberculosis reception center" after the advised interval, for the necessary diagnostic tests. The "tuberculosis reception centers" will maintain in their patient record file, adequate records of patients in whom the diagnosis of tuberculosis is doubtful, and will preserve all X-ray films of such patients until the case is closed. These records will be made available to other "tuberculosis reception centers" upon request.

c. It will be the responsibility of the commanding officers of the "tuberculosis reception centers" to notify the medical officer of any organization, in which an "open case" of tuberculosis is discovered, of the existence of such a case, and it will then be the responsibility of the unit medical officer to initiate promptly such studies as are considered necessary for the detection of pulmonary tuberculosis in intimate contacts of the patient.

d. Patients suffering from active tuberculosis or in whom there is a question of activity which will necessitate follow-up studies, will be evacuated promptly from all medical installations to the nearest "tuberculosis reception centers." In order to facilitate the routing of such patients, the hospital destination of the patient will be prominently noted upon MD Form 52d.

Following the publication of this circular letter, the triage of patients suffering from tuberculosis to the "tuberculosis centers" became excellent, and with it the care and disposition of the patients markedly improved.

Dermatological Conditions

By the fall of 1943, it became evident to the consultant in medicine that an improvement could be made in the methods used for the management of patients with diseases of the skin. After considering various measures to accomplish this end, he communicated his views to the Surgeon, NATOUSA, in the following letter dated 13 November 1943:

1. Dermatological conditions (excluding syphilis) are not being properly treated in NATOUSA. This is especially true of eczema and fungus infections of the hands and feet.

2. There are few qualified dermatologists in NATOUSA.

3. Two excellently trained dermatologists are upon the staff of the 46th General Hospital while one well trained and one fairly well trained dermatologist are upon the staff of the 64th General Hospital.

4. When the opportunity offers itself shortly, an appraisal will be made of the dermatologists in the General Hospital PBS.

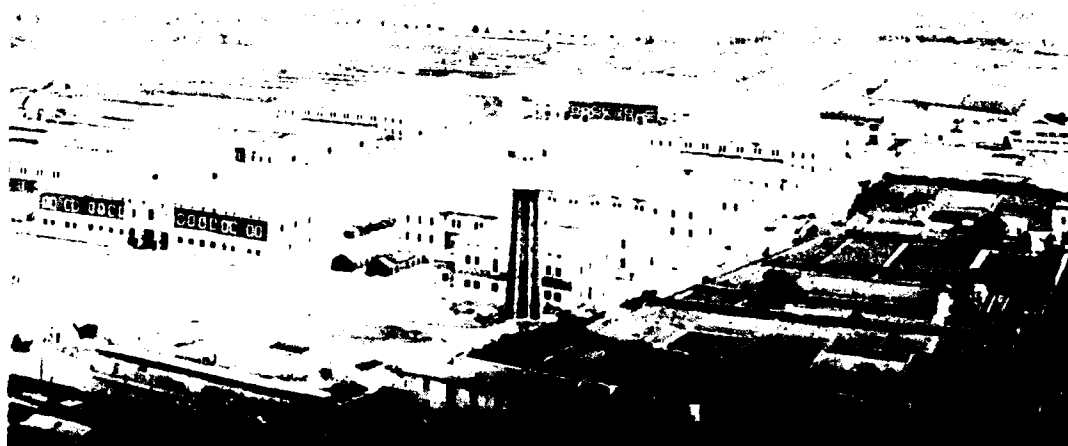


FIGURE 57.—64th General Hospital, Leghorn, Italy, 1945.

5. It is recommended that the 46th General Hospital MBS and the 64th General Hospital (fig. 57) EBS be designated as dermatological centers and that the facilities of these hospitals be made available for consultation, diagnosis and treatment of skin diseases within their respective Base Sections.

These recommendations were accepted. Early in 1944, a third dermatologic center was opened in the 45th General Hospital in Naples. It can be said without hesitation that the establishment of these centers created a renewed interest in dermatologic problems and that a definite improvement was effected throughout the theater in the treatment of diseases of the skin.

PENICILLIN

The medical use of penicillin in the North African theater began in the late summer of 1943. At that time, because the supply of the agent was limited, its use was restricted to cases in which sulfonamide therapy fell short of expectations. During the fall of 1943, the supply became more abundant, and, upon the recommendation of Colonel Long, most of the penicillin that was available for medical purposes was devoted to the treatment of gonorrhea which had proved resistant to therapy with the sulfonamides. By the end of the winter of 1944, enough penicillin was available in the theater to permit a more general use of this antibiotic. The full treatment of all cases of gonorrhea

and syphilis with penicillin was initiated on 1 August 1944. It was the policy in the North African theater to follow the instructions received from the Office of the Surgeon General concerning the medical uses of penicillin. As a result, there was little experimentation with the product, and it is felt that penicillin was both effectively and economically used in the theater.

DISPOSITION OF PATIENTS TO ZONE OF INTERIOR

The opening of the Italian campaign and the subsequent activation of the Peninsular Base Section with its numerous general hospitals created a problem in the disposition of patients to the Zone of Interior, which had not existed to any degree when the general hospitals were situated in North Africa. During the late fall and winter of 1943-44, many patients had to be evacuated to North Africa from Italy in order that a reasonable status of vacant beds might be maintained for any contingency that might arise. This meant that many patients, recommended by the medical disposition boards of general hospitals in Italy, were sent to hospitals in North Africa (fig. 58) to await evacuation to the Zone of Interior. In December 1943, complaints were heard from the general hospitals in Italy that many such patients, being reviewed by the medical boards of the general hospitals in North Africa, were being returned to a general service category. As a result, these men were then returned to their units in Italy, where, within short periods of time, they frequently had a return to their original disease and were rehospitalized, thereby necessitating a complete clinical review of the case with the attendant paperwork and other necessary processing. By the first of 1944, the situation reached a point where the medical services of the general hospitals in Italy and in North Africa began to question each other's professional qualifications.

At the direction of the Surgeon, the consultant in medicine made a thorough study of this problem and came to the conclusion that the root of the evil lay in a misunderstanding on the part of the general hospitals in North Africa of the environmental conditions existing in forward army, air force, and base areas. Upon the recommendation of the consultant in medicine, the Surgeon, NATOUSA, issued instructions in Circular Letter No. 21, dated 3 April 1944, concerning the disposition of patients from medical services. These instructions were based upon the natural history of certain diseases as observed in the theater and upon an appraisal of environmental factors that might influence the course of certain diseases. In formulating this policy, special consideration was given to establishing stringent criteria for the medical disposition of key commissioned personnel and Medical Corps officers. The important points of policy established were as follows:

1. The following memorandum is based upon experience gained in this Theater and is to be used as a guide by medical officers in formulating the disposition of certain patients from field, evacuation and station hospitals to general hospitals and from the latter to the Zone of Interior. This memorandum is to be used as a *guide* and not as a *directive* and should be so interpreted by medical disposition boards of general hospitals, especially when such boards are dealing with the disposition of medical officers or other key commissioned

personnel. It is of paramount importance that the manpower needs of the theater be safeguarded, but at the same time it is incumbent upon medical disposition boards to make a careful estimate of each patient's potential effectiveness, in order that effective manpower may be maintained at the highest level, and multiple admissions to hospital, resulting from recurrent or chronic disease be reduced to a minimum.

2. A study of the natural history of disease in NATOUSA has demonstrated that under the conditions which exist in this theater, the occurrence of the following disease entities in patients may be construed as relative indications that such individuals should be considered as candidates for limited service assignments (if medical officers or key commissioned personnel), or for evacuation to the Zone of the Interior. When the indications for evacuation out of the theater are considered absolute, such a statement will be made.

a. The existence of the following disease entities may be considered as an indication that the patient should be evacuated to the United States.

(1) Virus diseases.

(a) Anterior poliomyelitis with persistent paralysis. (b) Encephalitis lethargica (von Economo's disease). (c) Equine encephalomyelitis.

(2) Bacterial diseases.

(a) Diphtheria with a complicating persistent (6 weeks) paralysis, or any definite cardiac involvement. Care should be exercised to see that patients in the latter group are not evacuated until they are entirely free from clinical signs of cardiac involvement and essentially free from electrocardiographic changes. (b) Typhoid fever complicated by multiple relapses or by perforation of the ileum, generally requires a prolonged period of convalescence and such patients should be evacuated as soon as their condition permits. (c) Recurrent undulant fever. (d) Active pulmonary or other types of active tuberculosis. (e) Mycotic infections such as actinomycosis, blastomycosis, streptothricosis or sporothricosis.

(3) Protozoan infections.

(a) Malaria with chronic cachexia, resistant anemia, blackwater fever, repeated attacks of the cerebral type, or with repeated attacks of the disease and a permanently enlarged spleen. (b) Recurrent amoebic infection which is resistant to therapy or which has produced a chronic colitis.

(4) Diseases of doubtful origin.

(a) Acute or chronic rheumatic fever. (b) Disseminated lupus erythematosus. (c) Sarcoid.

(5) Diseases due to allergy.

(a) Asthma which is persistent, resistant to therapy, or to changes of environment, or which due to frequency of attack renders the diseased individual ineffective. (b) Recurrent, treatment-resistant, disabling angioneurotic edema.

(6) Diseases due to chemical agents.

(a) Chronic lead poisoning with encephalopathy or hypertension and vascular changes. (b) Proven, persistent damage to the hematopoietic system produced by chemical agents.

(7) Diseases due to physical agents.

(a) True sunstroke (*not heat exhaustion*). (b) Frost bite with gangrene resulting in incapacitating amputations.

(8) Diseases of metabolism.

(a) Diabetes in *enlisted personnel*. (b) Proven gout. (c) Diabetes insipidus.

(9) Diseases of the digestive system.

(a) Proven peptic ulcer in enlisted personnel. (b) Proven cases of mucus or spastic colitis. (c) Regional ileitis. (d) Recurrent intestinal diverticulitis. (e) Proven chronic pancreatitis. (f) Cirrhosis of the liver. (g) Chronic persistent, infectious hepatitis. (h) Relapsing or recurrent infectious hepatitis, with or without jaundice, which relapses or recurs despite adequate periods of convalescence and reconditioning.



FIGURE 58. Air evacuation from Italy to North Africa.

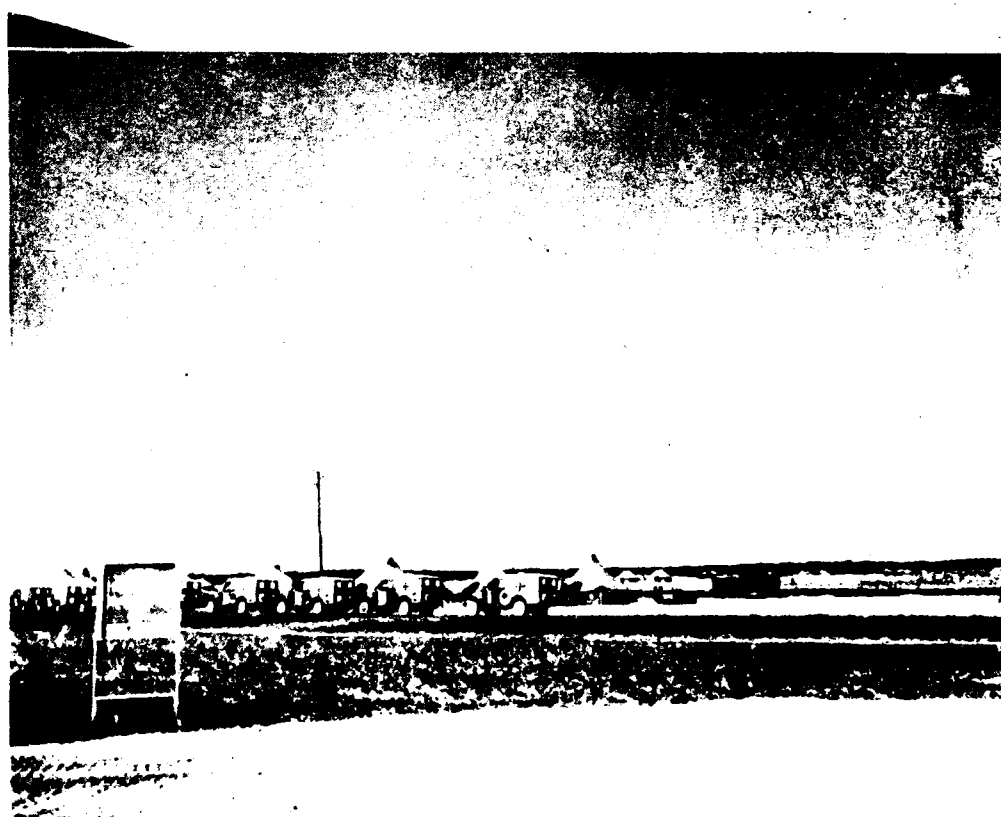


FIGURE 58. Continued.

(10) Diseases of the respiratory system.

(a) Chronic, persistent bronchitis associated with physical signs and X-ray changes. (b) Clinical, radiographically proven, moderate or severe bronchiectasis. (c) Subacute or chronic lung abscess.

(11) Diseases of the kidney.

(a) Paroxysmal hemoglobinuria. (b) Acute or chronic glomerular or interstitial nephritis. (c) Nephrosis. (d) Proven pyelonephritis. (e) Pyo- or hydronephrosis with decreased function in the other kidney.

(12) Diseases of blood-forming organs.

(a) Treatment resistant secondary anemias. (b) Pernicious anemia in enlisted personnel. (c) Leukemia or lymphosarcoma. (d) Hodgkin's disease. (e) Idiopathic thrombocytopenic purpura with enlarged spleen. (f) Hemolytic icterus. (g) Hemophilia. (h) Banti's disease.

(13) Diseases of the circulatory system.

(a) Chronic valvular heart disease except those instances in which the lesions are minimal and there is no history of recent rheumatic attacks. (b) Syphilitic valvular disease or aneurysm. (c) Subacute bacterial endocarditis. (d) Proven, chronic, myocardial disease with signs of functional failure. (e) Proven essential hypertension in *enlisted personnel*. (f) Thrombo-angiitis obliterans. (g) Proven coronary occlusion or insufficiency. (h) Angina pectoris in *enlisted personnel*.

(14) Diseases of the ductless glands.

(a) Exophthalmic goitre. (b) Addison's disease. (c) Proven hypo- or hyper-parathyroidism.

(15) Diseases of the joints.

(a) Recurrent persistent or crippling rheumatoid arthritis. (b) Still's disease. (c) Ankylosing spondylitis. (d) Degenerative arthritis in which symptoms and signs persist or in which repeated clinical attacks occur.

(16) Neoplastic disease.

(a) Malignant neoplastic disease with the exception of minor superficial lesions for which treatment is available in the Theater.

(17) Neuropsychiatric disease.

(a) All instances of progressive incapacitating neurological disease. (b) Epilepsy with grand mal attacks. (c) Psychoses. (d) Severe or frequently recurring psychoneuroses.

(18) Dermatological disease.

(a) Chronic incapacitating treatment-resistant or frequently recurrent dermatological diseases which are productive of prolonged hospitalization.

b. The existence of the following disease entities in *medical officers* or in *key commissioned personnel* may be considered as an indication that officer patients can be reclassified to a limited service status and retained within the theater.

(1) Disease of metabolism.

(a) Diabetes mellitus which is mild and for which adequate dietary and treatment facilities are available.

(2) Diseases of the digestive system

(a) Uncomplicated peptic ulcer for which an adequate dietary regime can be provided.

(3) Diseases of the blood-forming organs.

(a) Pernicious anemia in medical officers.

(4) Diseases of the circulatory system.

(a) Proven *essential* hypertension without symptoms or signs of renal or cardiac failure in medical officers. (b) Mild angina pectoris.

Following the publication of this circular letter, the problems concerning the disposition of patients were markedly reduced and were rarely the cause of disputes between hospitals.

LABORATORY SERVICES

During the first 7 months of his service in the North African theater, Colonel Long supervised the activities of hospital laboratories (figs. 59 and 60) by virtue of the fact that he was also acting as the preventive medicine officer. Following the establishment of the Preventive Medicine Service in the Office of the Surgeon, Headquarters, NATOUSA, the control of the laboratories passed to this service. This separation made for immediate difficulties because endless coordination at all levels was needed in order to have the laboratories function in their proper relation to the clinics. It must be remembered that clinical laboratory work, like roentgenology, is primarily an adjunct to diagnosis and therapy and hence should be subordinated to the various clinics in the hospital. This is the policy in effect in all university clinics and in the better class of civilian hospitals. When such a system is used intelligently, it tends to decrease the amount of laboratory work required for patient care, which, on the other hand, increases when the direction of laboratories is in hands other than those responsible for the care of the patient. It was the considered opinion of Colonel Long that the system of organization which placed the supervision of laboratories under preventive medicine was archaic and that the supervision of laboratories belonged to the Medical Consultants Division.

PROBLEMS OF EVACUATION AND HOSPITALIZATION

Principles of evacuation and hospitalization in the Mediterranean theater were finally crystallized, but only after a long process of evolution. Part of the difficulty arose from the fact that both evacuation and hospitalization had dual aspects. These aspects were largely administrative or operational problems, it is true; but it is equally true that both had basic clinical components which could not be ignored. At times, some officers in charge of evacuation in certain base sections did not understand this fact. This was particularly true during the first 18 months of the life of the theater when some sick and wounded were moved about in frantic haste.

In spite of his realization of the importance of logistic and other considerations, the consultant in medicine could not lose sight of the fact that, when casualties passed through a number of hospitals, breaks in the even tenor of medical care occurred, and therapy was interrupted. From a sound professional viewpoint, the best interests of neither the Army nor patient would have been served if the consultant in medicine had not continuously interested himself in such matters and struggled to keep medical care at respectable levels. *Continuity of treatment was of prime importance in the care of the sick or wounded patient.*



FIGURE 59. Hospital laboratory activities. A. Bacteriology. B. Histopathology.



FIGURE 60. Mobile laboratory, Florence area, Italy, 1945.

MEDICAL CARE OF PRISONERS OF WAR

Before the battle for northern Tunisia in May 1943, Colonel Long was requested to submit to the Surgeon, NATOUSA, his views upon the provision of medical care for prisoners of war (fig. 61). This request was answered in two memorandums; the first, dated 18 March 1943, covered the prevention of disease in prisoners of war, while the second, dated 19 March 1943, detailed in broad outline professional services for prisoners of war.

The text of the 18 March memorandum follows:

Subject: Prevention of Disease in Prisoners of War

1. The coming battle of Tunisia will throw a heavy strain upon existing medical and sanitary facilities in the AUS [Army of the United States], NATOUSA, because in addition to the medical cases of enemy sick and wounded, the AUS will be charged with the prevention of disease among captured enemy troops. This burden will fall mainly upon the AUS because present plans call for the evacuation of prisoners of war along American lines of communications.

2. Every effort must be made to prevent the outbreak of epidemic disease among the anticipated prisoners of war not only because of the humane aspects of the problem, but also because of the dangers to our own forces which would be created by such outbreaks.

3. At the present time G-2 [intelligence] has very little information concerning the



FIGURE 61—German and Italian prisoners of war, North Africa, 1943

status of immunization procedures carried out in enemy troops. Current information from nonmilitary sources would lead one to believe that the following procedures are in effect:

	German	Italian
Typhoid Inoculations	+	+
Tetanus	0	+
Typhus	+	?
Smallpox	+	+

Accurate information upon this point should be obtained at once through the *interrogation* of prisoners and by asking for information upon this point from Cairo.

1. There are three main health problems which will concern prisoners of war: typhus, malaria and dysentery.

a. Typhus. According to available nonmilitary information at least a portion of the German army is inoculated with Weigl's vaccine (typhus). The exact protective action of this vaccine is unknown under field conditions but it is likely that the German vaccine is at least as protective as the Cox vaccine used by the American Army. The status of the Italian army in respect to typhus vaccination is unknown. Excerpts from diaries of captured Italian soldiers as published in the weekly *G-2 reports* speak of the lousiness of the Italian troops. It is to be assumed that there will also be a considerable degree of lousiness in German prisoners. Every effort must be made to combat this situation by delousing procedures (fig. 62), because if typhus breaks out in prisoners of war, it will not only throw an added and unwanted burden upon our hospitals, but due to quarantine regulations, the movement of the prisoners toward base camps in the L.O.C. (lines of communications) and to the Z.I. (Zone of Interior) will be greatly hampered. To prevent such an occurrence, delousing and bath units, both British and American, should be mobilized in the forward units and prisoners of war should be deloused before they are concentrated in large prison



FIGURE 62.—Delousing of prisoners of war.

pens. To accomplish this, immediate plans should be made in consultation with the Engineer Corps, Quartermaster Corps and the Provost Marshal, to cope with the lousiness of prisoners of war. In addition to delousing, adequate stocks of lice powder should be available in the forward area.

b. Malaria. The concentrations of prisoners in exposed areas, without the benefits of mosquito nets and other physical methods of malarial control will result in many cases of malaria if rigid prophylaxis of the disease is not carried out in prisoners of war. This should be done by the administration of Atabrine 0.2 gram, on Monday and Thursday nights after the evening meals from the 22nd of April until the 30th of November. The responsibility for the enforcement of this scheme should be placed on the shoulders of the various enemy noncommissioned officers who will have certain responsibilities for the enforcement of discipline in their respective prison pens. Inasmuch as there is no knowledge concerning the enemy stocks of Atabrine in Tunisia and because of the possibility that existing stocks might be destroyed as a result of action on our own part, or that of the enemy, plans for the prophylaxis of malaria among prisoners of war should envisage that the AUS will supply the Atabrine needed to carry out this procedure.

c. Dysentery. Due to the necessarily exposed conditions of prison camps, the lack of sanitary facilities, and the impossibility of screening cook shacks and messhalls, it is likely that dysentery will be a problem among prisoners of war. To offset this threat, a most rigid and severe sanitary discipline must be enforced in all prison camps in respect to the disposal of human excreta and every effort must be made to remove fly breeding sources from the environs of all prison camps to a distance of at least one and one-half miles. Even if such measures are enforced it is likely that a considerable amount of dysentery will occur and that sulfaguanidine in large quantities will be needed for the treatment of this disease.

Provisions should be made immediately for increasing the supplies of sulfaguanidine in NATOUSA and for maintaining such supplies at a high level. As far as it is known, very little if any sulfaguanidine is produced in Germany or Italy, hence captured supplies will probably be negligible.

The text of the 19 March memorandum follows:

Subject: Professional Services for Prisoners of War

1. The anticipated number of prisoners of war as laid down in recent G 3 [operations] reports will throw a heavy strain upon the medical personnel and facilities of the AUS in NATOUSA. In order to lighten this burden every effort should be made to initiate preventive measures and to coordinate medical services for prisoners of war.

2. A primary consideration must be that of personnel, and to this end, it is suggested that medical officers be detailed to each secondary forward concentration area to initiate and supervise sanitary and preventive procedures and to look after the health of prisoners. As this will be a dispensary type of medical practice, such supplies as are needed should be made up and allotted to each concentration area in advance. In order to relieve the strain upon AUS medical personnel the services of captured medical officers should be utilized at the earliest possible moment in the medical care of prisoners of war. To facilitate this, plans should be made with the Provost Marshal to the end that enemy medical officers and medical corps men should be routed as soon as possible to concentration areas and that this should be done with a minimum of delay and red tape. In the Middle East, the British have utilized the services of enemy medical officers within 24 hours after their capture.

3. The aim of the medical service should be to cut down the average period of hospitalization required for the treatment of a given disease to a minimum which is consistent with good medical practice. In the instance of infectious diseases which require hospitalization and for which there exist specific therapies, it is well known that the sooner the patient comes under adequate treatment, the more promptly is a cure accomplished and hence the shorter is the period required for hospitalization. It is likely that acute infections will account for the majority of requests for the hospitalization of prisoners and in order that their stay in the hospital will not be prolonged, arrangements must be made for the prompt and rapid evacuation of prisoners of war to medical installations for the definitive treatment of infectious diseases. This will require a plan which will cover the evacuation of enemy patients from forward areas, through the L.O.C. and in the MBS [Mediterranean Base Section] and ABS [Atlantic Base Section] along the routes and in the base section hospitals, where prison ward facilities should be designated for the reception of these patients.

Upon receipt of the memorandums, the Surgeon, NATOUSA, had them circulated to the interested staff sections. By some accident of fate, instead of their being returned to the surgeon's office, they were buried in the records section of the Adjutant General's Office, AFHQ, and no action was taken upon the recommendations made in them. By May 1943, the battle for northern Tunisia was well under way, and prisoners of war (fig. 63) began to stream in by the thousands. At that time, it was found that, through agreements made at a general staff level, the care of prisoners of war taken in northern Tunisia would become the initial responsibility of the British. After being processed, the majority of German and Italian prisoners would then be turned over to the U.S. troops at points near Constantine for transportation to compounds in the Mediterranean and Atlantic Base Sections. The British were therefore responsible for the initial steps to be taken in the prevention of disease in prisoners of war and for the segregation and division of protected personnel.

In the course of a tour of inspection made by the consultant in medicine



FIGURE 63. Prisoners of war, Tunisia, 1943.

during the closing days of the campaign in northern Tunisia, it was noted that the recommended measures for the prevention of disease among prisoners of war were being disregarded by both of the capturing powers and that little use was being made of enemy medical officers for the care of their own nationals. The following memorandum was prepared for the Surgeon's signature and was sent to the Provost Marshal General, NATOUSA, on 17 May 1943:

1. Insofar as it is possible prisoner of war medical officers and corpsmen should be used to assist in the prevention of disease and the care of the sick and wounded in prison compounds.
 - a. In order to assure an adequate supply of such medical personnel it is therefore recommended that enough of such protected personnel be retained in this theater until the prisoners of war are all evacuated.
2. Prisoners of war should immediately receive a stimulating dose of 0.5 cc. of T.A.B. typhoid vaccine upon entering American prison compounds.
3. Prisoners of war should be placed upon suppressive Atabrine therapy as outlined in paragraph 2, NATOUSA Circular No. 38, dated 20 March 1943, and it is strongly recommended that this suppressive therapy be continued for one month after they reach their final destination in USA.
4. Additional medical supplies required should be requisitioned from the Base concerned.

By the first week in June 1943, prisoners of war were arriving by the thousands (fig. 64) in the Mediterranean and Atlantic Base Sections, and, although the bare outlines of compounds had been erected, little else had been prepared for their arrival. None of the recommendations as to immunization had been effected, suppressive therapy with Atabrine was being carried out by fits and



FIGURE 61. U.S. Army trucks loaded with German prisoners arriving at a prisoner-of-war camp, near Mateur, Tunisia, 10 May 1943.

starts, and the sanitation within the compounds was generally poor. As a result, malaria and dysentery were rife, and, because of the slowness with which enemy medical personnel was being obtained from the British, American hospitals had to look after the prisoner-of-war sick. The following report upon these conditions was made early in June to the Surgeon, NATOUSA:

Diarrhea and Dysentery in Prisoners of War

A considerable amount of dysentery is occurring in prisoners of war in the forward areas. Prisoners of war are being sent to American areas in very unsanitary convoys.

This results in dysentery developing among prisoners on their way to, and after they arrive in American controlled prison camps.

Because of the unsanitary conditions which prevail, a line of potentially infected material is being created along the railroad line from Constantine to Casablanca. This is evidenced by the following statement taken from Lt. Paul Goetze, ASN 53, 1st Flak regiment, German Army:

"On May 31 this officer and 39 other officer prisoners were placed in a barrel car at Constantine. The food provided for them for their trip was adequate, but no water was furnished them and they got none until the second day of their trip. On the first day out 4 officer prisoners developed dysentery and on the next day two more came down with the same disease. Because there were no latrine facilities (not even a flimsy can) in the car they had to defecate in their bread bags, which they then threw out of the railway car. On the second day of the trip, the train stopped and all were allowed to go to the latrine." This prisoner was taken off the train at St. Barbe at 11:30 A.M. on June 3, 1943, because he was suffering from acute dysentery and was placed in the 16th Evacuation Hospital.

The fact that prisoners are coming down the line with dysentery constitutes a grave health menace to American troops because the infected feces will constitute sources of infection all along the way. Immediate steps should be taken to eliminate unsanitary conditions along the convoy line. Latrines should be built at proper intervals and should be policed daily. It is said that latrines have been contemplated but that little has been done about them, because no service will take the responsibility for looking after them.

The consultant in medicine conferred with the British consulting physician, and they agreed that the consulting physician would do all in his power to bring about an improvement in the care of prisoners of war before they were turned over to the Americans and would try to expedite the movement of prisoner-of-war hospitals and the needed medical personnel from the British to the American areas. After a further conference by these two officers with the officer in charge of prisoners of war in the office of the Provost Marshal General, NATOUSA, the following informal memorandum was sent to the Provost Marshal General, on 11 June 1943:

1. Enemy medical personnel should be segregated until classified and recommendations are made as to their disposal by The Surgeon, NATOUSA. This scheme will provide adequate medical personnel for the POW camps and will permit us to keep the needed specialists in the theater. This has been agreed to informally.
2. The P.M.G. plans for medical care of POW on ships returning to US or UK is considered adequate from a professional point of view.
3. Those cadres of prisoners of war which will remain in the theater for any length of time should receive the various immunizations prescribed in Army Regulations and modified as to subsequent doses in NATOUSA.
4. Every effort should be made to maintain camp sanitation. Flies must be kept down to avert outbreaks of dysentery. Fly-swatting squads should be on duty daily in all compounds in the kitchens and around latrines. Kitchens should be screened.
5. Every effort should be made to expedite the shipment of the captured hospitals, their equipment and personnel, to the POW camps in order to relieve American medical personnel.
6. The Consulting Physician (Br) and the Consultant in Medicine (A) will be glad to render any aid within their province on the professional service aspects.

Unfortunately for all concerned, a sweeping reorganization of the office of the Provost Marshal General took place at about the time this memorandum was submitted, causing further delays in carrying out the suggested changes.

At the opening of the campaign in Sicily, the preparations for the reception and processing of prisoners of war in the Eastern Base Section were still primitive, as was indicated by the following report made by the consultant in medicine to the Surgeon, NATOUSA, on 25 August 1943:

* * * * *

6. *POW Medical Service and Sanitation.* One would have imagined that the P.M. [Provost Marshal], EBS [Eastern Base Section] had never been previously informed that an offensive operation was contemplated and that prisoners would be taken. (The P.M., EBS, complained that he had had little help from NATOUSA.) When the first prisoners arrived, the stockades were half completed, latrine pits not dug, latrine boxes not flyproofed, kitchen facilities and waste disposal were primitive, water and rations were short, delousing facilities were lacking, medical supplies were short, one medical officer was in the area, and a battalion of the 135th Infantry had to be used to guard prisoners because but a handful of the P.M. representatives were available. The POW (especially the Italians) arrived ex

hausted and ill with dysentery and malaria. Scabies was frequent and venereal diseases were not uncommon. They were herded off the LST's (on which water was frequently short), lined up in the hot sun, and then marched along the main roads to the POW compound. (The result was always an important traffic block.) En route many fell out from heat exhaustion or from other causes. On one occasion a large group of POW burst through their road guards like a bunch of wild animals and practically threw themselves into a badly contaminated well, so great was their thirst. Such conditions were undoubtedly responsible for the lighting up of chronic malarial infections in the prisoners, with the result that they took up hospital beds in the Bizerte-Mateur area which otherwise would have been available for use by American patients. The one medical officer in the compound did a sterling job without much assistance. He selected POW medical officers and corpsmen as his aides, and soon had a smooth running dispensary which took care of many of the medical needs of the prisoners.

As the organization and planning in respect to the care of prisoners of war became more mature, an improvement was noted in the manner in which they were handled, as is evidenced by the following paragraph taken from a report made to the Surgeon, NATOUSA, on 29 September 1943:

1. The following report is based upon data available in the WD MD Forms 86ab for prisoners of war. To obtain information upon the morbidity resulting from certain diseases, the records of the 56th Station Hospital, 16th Evacuation Hospital, 21st General Hospital, 78th Station Hospital, and the 80th Station Hospital were studied. These hospitals were selected because the bulk of the sick prisoners of war who were hospitalized between June 15th and September 15th, entered these hospitals.

a. Morbidity. In the discussion of morbidity the hospitals will be grouped as follows: (1) 56th Station Hospital, 16th Evacuation Hospital, and 21st General Hospital. (2) 78th Station Hospital and 80th Station Hospital. This grouping has been adopted because the prisoners entering the hospitals listed in the first group were Germans and Italians taken primarily in the Tunisian campaign, while those in the second group were primarily Italian prisoners taken during the first phase of the Sicilian campaign.

b. Deaths. All deaths recorded upon the MD Form 86ab for prisoners have been grouped as to cause.

2. Morbidity.

a. 56th Station Hospital. In the period from June 11 to August 13, 1943, the total admissions into this hospital for certain infectious diseases were as follows: (1) Diphtheria—15 cases. (2) Primary atypical pneumonia—11 cases. (3) Tuberculosis—9 cases. (4) Dysentery—532 cases. (5) Typhoid fever—1 case. (6) Malaria—432 cases. (7) Jaundice—28 cases. (8) Smallpox—2 cases. (9) Typhus—1 case.

b. 16th Evacuation Hospital. From June 18th until August 8th, 1943, the following prisoner-of-war patients were received: (1) Diphtheria—5 cases. (2) Primary atypical pneumonia—5 cases. (3) Tuberculosis—3 cases. (4) Dysentery—194 cases. (5) Typhoid—1 case. (6) Malaria—310 cases. (7) F.U.O.—28 cases. (8) Jaundice—51 cases.

c. 21st General Hospital. From June 18th until September 11th, 1943, the following prisoner-of-war patients were received: (1) Tuberculosis—8 cases. (2) Dysentery—48 cases. (3) Typhoid fever—8 cases. (4) Malaria—157 cases. (5) Jaundice—8 cases. (6) F.U.O.—8 cases.

d. 78th Station Hospital. From July 17 until September 25, 1943, the following prisoner-of-war patients were received: (1) Primary atypical pneumonia—12 cases. (2) Tuberculosis—16 cases. (3) Dysentery—43 cases. (4) Typhoid—4 cases. (5) Malaria—587 cases. (6) F.U.O.—225 cases. (7) Jaundice—12 cases.

e. 80th Station Hospital. From July 24 until September 25, 1943, the following prisoner-of-war patients were received: (1) Primary atypical pneumonia—10 cases. (2) Tuberculosis—6 cases. (3) Dysentery—20 cases. (4) Typhoid fever—7 cases. (5) Malaria—609 cases. (6) F.U.O.—150 cases. (7) Jaundice—16 cases.

f. Total number of patients in each disease category received by the above mentioned hospitals during the stated periods.

- (1) Diphtheria—21 cases
- (2) Primary atypical pneumonia—38 cases
- (3) Tuberculosis—42 cases
- (4) Dysentery—827 cases
- (5) Typhoid fever—21 cases
- (6) Malaria—2095 cases
- (7) F.U.O.—411 cases
- (8) Jaundice—115 cases
- (9) Smallpox—2 cases
- (10) Typhus—1 case (Another case was reported in an Italian prisoner of war by the 23d Hospital)

g. Discussion of observed disease morbidity in prisoners of war. The high initial occurrence of dysentery in patients on admission to the 56th Station Hospital and 16th Evacuation Hospital (ABS [Atlantic Base Section] and MBS [Mediterranean Base Section]), reflects the unsanitary conditions which prevailed along the route and in POW compounds which were not ready to receive the influx of over 200,000 prisoners which were taken at the end of the Tunisian campaign. It is to be noted that as sanitation improved, admissions for dysentery fell. It is interesting to observe that on the contrary in the 78th Station Hospital and 80th Station Hospital (EBS) [Eastern Base Section], the admissions for dysentery were low. This was probably due to a short evacuation route and a relatively well sanitized POW compound in EBS. The admissions for malaria follow a trend which is quite comparable to those noted for American troops so it can be assumed that the patients entering the 56th Station Hospital and 16th Evacuation Hospital at least in part, contracted their disease either in POW compounds or en route to them across North Africa. The patients ill with malaria entering the 78th Station Hospital and 80th Station Hospital during July and the first week in August obviously contracted their disease in Sicily. However, it seems quite probable (and this thesis is supported by a shift from 10 vivax infections to 1 falciparum infection, to 3 vivax infections to 1 falciparum infection in prisoners of war in EBS) that many of the cases of malaria developing after the first week of August were the result of infections incurred in North Africa. The high percentage of F.U.O. noted in the EBS resulted from the non-recognition of sandfly fever, the treatment of true malaria before blood films could be taken, and from inadequate laboratory work due in turn to the influx of febrile patients. On some days as high as 150 or 200 blood films were examined in a single station hospital laboratory. Jaundice has been increasing in the prisoners of war, but not out of proportion to the increase of this disease noted in our own troops. There have been 42 instances of tuberculosis recognized. There are probably more unrecognized cases among the prisoners. It is interesting that 38 instances of primary atypical pneumonia have been noted. The occurrence of 21 cases of typhoid fever is indicative of crowding, imperfect sanitation and incomplete vaccination. As steps have been taken through *command channels* to re-vaccinate fully all prisoners of war against typhoid fever, a lessened incidence of this disease should be observed in the future. Twenty-one cases of diphtheria occurring in a period of the year in which the incidence of diphtheria is minimal probably reflects crowding, the non-recognition of early cases of the disease and a normal or slightly high carrier rate. It is interesting to note that 15 of these cases were received in the 56th Station Hospital in ABS and occurred in prisoners taken in the Tunisian Campaign. Two cases of smallpox and two of typhus have been recorded in prisoners.

3. Deaths. The following causes of death have been recorded. These data are fairly but not completely accurate because deaths among prisoners of war occurring in other than the stated hospitals are not listed. Those occurring in POW camps are included.

<i>Cause</i>	<i>Deaths</i>
Malaria.....	24
W.I.A.....	12
Hypertension.....	1
Brain Abscess.....	2
Dermatitis exfoliativa (arsenical).....	1
Acute Nephritis.....	1
Typhoid Fever.....	3
Acute Amoebic Colitis.....	1
Acute Ulcerative Colitis.....	1
Acute Infectious Hepatitis.....	1
Carcinoma.....	1
Dehydration and Exhaustion.....	2
Coronary Thrombosis.....	4
Dead on arrival (?).....	1
Respiratory paralysis.....	1
Tuberculosis.....	2
Suicide.....	1
Killed by guards.....	8
Diphtheria.....	2
Pneumonia.....	3
Accidental.....	1
Ruptured Appendix.....	1

A survey of these deaths shows one striking thing; namely, that the case fatality rate from malaria in prisoners of war far outstrips that observed in American troops. An example of this is that of 2095 admissions to prisoner-of-war hospitals for malaria, 16 or 0.77 percent died. When one considers the conditions of concentration, surveillance, supervision, etc., under which the prisoners were kept, this is a high case fatality rate. The two deaths listed as "dehydration and exhaustion" were undoubtedly due to imperfect handling of POW personnel while in transit. The deaths from diphtheria are tragic.

4. Summary. The record of the prevention and treatment of disease among prisoners is fair. Two great causes of morbidity (malaria and dysentery) could have been markedly reduced if adequate preparations for the reception and care of prisoners of war had been made. The following figures (which are based upon average periods of hospitalization noted for American patients) show the number of hospital-bed days taken up by prisoners of war who were suffering from diseases for which preventive measures are well established.

a. Malaria.....	31,425 days
b. Dysentery.....	4,135 days
c. Typhoid fever.....	745 days
Total.....	36,305 days

5. Consolidated figures received from the Surgeon MBS, show that 77 cases of typhoid fever in POW have been admitted to POW hospitals #129 and #130 since July 4th.

In the winter of 1943-44, the German prisoner-of-war hospit. I was moved from its former location to Prisoner of War Camp No. 131, and following this move the personnel of the hospital lost their "protected" status and were treated by the local compound commander as ordinary prisoners of war. This violation of the Geneva Convention was noted by the consultant in

medicine, in the course of an inspection of the hospital, and was made the subject of the following report to the Surgeon, NATOUSA, dated 17 May 1944:

1. When the original German POW Hospital was set up near Ste. Barbe, the German medical officers and corpsmen were given the full status of "Protected Personnel" and were allowed recreational facilities *outside* of the prison compound after working hours. There was at least one violation of this status and the offending German medical officer reverted to a POW status.

2. In December 1943, this POW Hospital was moved from Ste. Barbe to its present location within a compound in PW Camp #131, and since that time German medical officers and corpsmen have not been permitted to leave the stockade which in part is guarded by *Italian Carabinieri*.

3. In the course of an inspection of the professional services of this hospital made upon May 10, 1944, Dr. Meyer, the German Surgeon of the hospital, stated that the restrictions placed upon his medical officers and corpsmen represented a violation of the "Protected Personnel" clause of the Geneva Convention of 1929, and that as a result of this violation, he does not feel that he can ask his officers and corpsmen to behave as "protected personnel" when actually in one respect, they are being treated as ordinary prisoners of war.

4. From time to time, the repatriation of wounded and sick German POW takes place from this hospital and it can be assumed that when such prisoners come under enemy authority, they are questioned regarding the "Protected Personnel" status of medical corps personnel in the POW Hospital, and that retaliatory measures will be taken against American Medical Corps [Department] personnel, now held by the enemy, if the "Protected Personnel" status of the German medical officers and corpsmen is questionable.

5. It is therefore recommended that the necessary steps be taken to insure to the fullest extent the "Protected Personnel" status of German medical corps personnel now in our hands.

Action was immediately taken by the Surgeon, MTOUSA, with the result that the Provost Marshal, Mediterranean Base Section, restored in part the "protected" status of the medical department personnel of the German hospital.

From the summer of 1944 until the capitulation in Italy, German medical department personnel received privileges that were pretty much in accord with the Geneva conventions, and the sick and wounded prisoners of war received adequate treatment. At the time of the capitulation in Italy, many thousands of sick and wounded Germans and hundreds of German medical department personnel (fig. 65) fell into the hands of the U.S. Army. The decision was immediately taken to utilize all captured German medical installations to their fullest extent. Two large German hospital centers at Bolzano and Cortina had been taken over, and the capacity of these centers was increased by the addition of isolated hospitals that had been captured. Colonel Long made an extensive study of these hospitals in May and June 1945 and reported to the Surgeon, MTOUSA, on 11 June 1945, as follows:

1. This study is based upon practices observed in German General and Camp Hospitals in the Merano and Cortina and Chide areas and upon interviews and discussions which were held with Col. Mause, the chief consultant in medicine of the German Army Group in Italy, Lt. Col. Professor Horster, (Würzburg) Chefarzt of the German Hospital in the Palace Hotel, Merano, Lt. Col. Professor Schopper, (Leipsic) Consultant in Pathology to the Army Group, Major Assistant Artz Veith, (Freiburg) Pathologist in the Pathological Laboratory, Merano group of hospitals, Lt. Col. Professor Marks, (Münster) Consultant in Medicine to the 10th German Army, Lt. Col. Professor Bock, (Würzburg) Consultant in Medicine



FIGURE 65. German medical officers, under command of Maj. Henry M. Carney, MC, U.S. Army, in hospital of U.S. prisoners-of-war stockade, Santhià area, Italy, March 1945.

to the 11th German Army, Lt. Col. Schreiber, Chief of the German General Hospital in the Savoia in Cortina, Col. General Menardus, Surgeon of the German Army Group in Italy, Major Peters, Chief Malariaologist, German Army Group in Italy, and numerous *Stabsärzten* in the German hospitals which were visited. It is believed that they represent a true cross section of medical practices in German General Hospitals in Italy. In every instance, the German medical officers who were interviewed or with whom the Consultant in Medicine went ward rounds, were entirely cooperative, were polite, gave out information freely, and were not arrogant. This experience is to be contrasted with that reported by the Consultant in Surgery, who found the German surgeons arrogant. Perhaps this observation means that in the German army, as in other armies which the Consultant in Medicine has had the opportunity to observe, the physicians of necessity are meek and lowly.

2. The medical practices in these German general hospitals were, by and large, very good. The records of all patients who were observed were well kept, neat and complete. The German system of charting the complete course of the patient upon temperature charts from his time of entry into a hospital installation, made it very easy to follow the course of disease in any given patient. The laboratory work in general was adequate and while certain of the laboratory tests which are commonly used in American hospitals were not in evidence, due either to a lack of materials or to unfamiliarity with the tests, those which were being utilized were being used intelligently. Therapeutic practices were somewhat similar to those in the American Army, with the exceptions that more non-specific protein fever therapy was being used and there was a tendency to employ parenteral products frequently, when from the American point of view, peroral therapy would have sufficed. The medical ward officers in these general hospitals seemed to be adequately trained in the art of history taking, physical examination and the proper utilization of the laboratory tests which were available. The Consultant in Medicine was struck by the fact that the average period of hospitalization and convalescence for practically every disease observed in these German hospitals was considerably longer than that in American military hospitals in

MTOUSA. This means that the average noneffective days' rate per patient was higher in the German army. It also appeared that the criteria used for the discharge of medical patients to a civilian status from the German army were less severe than those in force in the U.S. Army.

3. In general, the bulk of the patients seen, except at Chide, were true general hospital types of patients, and in American hospitals would have been classified as "C" for evacuation to the Zone of the Interior. This same classification would have been given these patients by the German medical officers, had not their "Zone of the Interior" disappeared during April and May. Hence the eventual disposition of many of the patients will be a problem unless some arrangement can be made for their return to Germany and their discharge from the German army.

4. The following diseases were especially observed:

a. Field or War Nephritis. This disease was quite a problem in the German army in Italy during the winter of 1944-45 and a great problem every winter in Russia. Lt. Col. Professor Marks states that at one time, when he was medical consultant in a hospital center in Germany, he had 3000 cases of Field Nephritis under his supervision. At the time this visit was made it was estimated that there were about 500 patients ill with Field Nephritis in the two hospital centers. The following are points of interest concerning this disease.

(1) Etiology. There is one school of thought in Germany which believes that field nephritis is a virus disease; however, Lt. Col. Professor Marks states that Volhard and others in Germany consider the disease to have the same etiological basis as does the type of hemorrhagic glomerular nephritis seen in civilian life. In surveying the histories of and talking to about 40 patients with this disease, a story of a recently antecedent nasopharyngitis (hemolytic streptococcal infection) was rare and the onset of the disease was ordinarily insidious in nature. The German medical officers considered that sudden chilling or wetting played an important role as a precipitating etiological factor in field nephritis. The average time from the appearance of symptoms and signs to first hospital entry was 10 days.

(2) Facial and ankle edema were the most common presenting signs. Headache was uncommon. In a few instances a grossly bloody urine was noted as the first sign.

(3) On entry into the hospital, the common signs were facial and ankle edema, hypertension and a urine which showed from 1 to 2 plus albumin with many hyaline and granular casts and red blood cells. Clinical evidence of cardiac enlargement and uremia were rare. In many instances the NPN was normal and rarely was it highly elevated. Lt. Cols. Professor Marks and Horster both stated that abnormalities of the fundi were rare.

(4) The clinical course of the disease in the patients whose records were examined was quite constant. In most instances the edema disappeared quite promptly and the blood pressure returned to normal within a few days. If the NPN was elevated it also returned to within normal limits within a few days. From this point on, the course of the disease had to be judged primarily from laboratory tests. The albumin slowly disappeared but there was a persistence of microscopic hematuria for weeks and months, and the dilution-concentration tests showed definite abnormalities over long periods of time. These two examinations were the ones which were depended upon most and a normal urinary sediment from repeated fresh morning specimens and normal dilution-concentration tests were used as criteria in determining the cure.

(5) The prognosis for recovery in the great mass of patients was said by the German medical officers to be good. However, it was their practice to recommend for discharge from the army all patients whose urinary sediments and dilution-concentration tests were abnormal at the end of six months' observation. None of the medical officers had had an opportunity to observe the eventual course of patients returned to civilian life. Relatively few patients had died in the acute or subacute stage of this disease while in army hospitals.

(6) The treatment consisted of absolute bed rest, a modified Karrel diet for the first three days, this then followed by fruit and fruit juices for 5 days, and then the patient was placed on a low protein (20 to 40 grams of protein) salt-free diet. Bed rest was

absolute for about one month and quite well maintained for three months. Lt. Col. Professor Marks also used the "Hunger and Thirst" regime for three-day intervals about once [a month] in all of his patients. Lt. Col. Professor Horster did not use the "Hunger and Thirst" regime. Both observers added salt in gradually increasing amounts to the diets of these patients before they were permitted to be up freely, and it was generally 3 or 4 months before the patients were placed on the normal hospital diet.

(7) Comment. It can be said with certainty that the type of kidney disturbance which has just been described did not occur in any appreciable amount in the American troops who were in contact with the Germans in the northern Apennines during the winter of 1944-45. No explanation for this difference can be offered.

b. Infectious Hepatitis. This disease was first noted in epidemic form in the Afrika Corps in the winter of 1941-42. Later it became epidemic in German units in Russia and there was a high incidence of the disease in the German forces in Italy during the fall of 1943. In the fall of 1944, while the incidence of the disease was increased, it did not reach epidemic proportions. This, the Germans attributed to the development of a herd immunity throughout their army. The Germans were certain that the disease was caused by a virus, but believed that it was spread by droplet infection. They had no idea that the virus was present in the stool of hepatitis patients.

(1) Diagnosis was made generally after jaundice appeared. The only liver function test employed was the Taka-Arata test.

(2) The sheet anchor employed by the Germans in the treatment of hepatitis was absolute bed rest for 4 or more weeks. The diet used was of the conventional, old fashioned, high-carbohydrate, low-fat type. The average period of hospitalization was eight weeks. Relapses have been uncommon since the prolonged hospitalization program has been in effect, but were very common initially in the Afrika Corps when patients with hepatitis were either kept on duty or were released from hospital when their jaundice had disappeared. The intensive hospitalization program began about the middle of 1942 and has been strictly adhered to since.

(3) The Germans have conducted fairly thorough studies of the pathology of hepatitis by means of "liver-punch" biopsies. Their findings are in line with those made in this theater.

c. "Trench Fever," Volhynia Fever. There were hundreds of cases of this louse-borne disease among troops in the Mediterranean area in the winters of 1943-44, 1944-45. It reached epidemic proportions in German troops in Russia.

d. Atypical Primary Pneumonia. The German medical officers insisted that this disease was unknown (unrecognized?) in Germany prior to 1939. The first appearance of this disease in the German army occurred in Greece in 1941, at which time it was considered a "new" disease. Following the publication of abstracts of American papers upon this disease in German, the true nature of the "Grecian" disease was recognized. Since that time it has appeared sporadically in the German army. It is the opinion of the consultant in medicine that there has been much more atypical pneumonia in the German army, but because routine roentgenograms of the chest were not made (only sparingly so) the disease was frequently missed. At one hospital in which X-ray films of the chest were made frequently, an approximately normal admissions rate for this disease was noted.

e. "Trench Foot." As the Germans said, a word for this condition does not exist in the German language. Plenty of true frostbite was seen in the Russian Campaign but all German medical officers stated that they had not seen "Trench Foot" in German soldiers in MTOUSA during the winters of 1943-44 and 1944-45. In fact some of them said that they had traveled many miles to observe American prisoners of war who were suffering from "Trench Foot." They attributed this absence of "Trench Foot" to:

(1) Excellent foot hygiene and discipline.

(2) The easily removable high leather German field boot.

(3) The four pairs of thick but loosely woven all-wool high stockings provided to German forward troops in winter.

f. Peptic Ulcer. Many patients suffering from peptic ulcer were seen. All had been confirmed by roentgenograms and all were being treated by low residue diet *without alkalies*. The average period of treatment was 4 weeks. Patients with initial severe symptoms, with gastroenterostomies or with partial resections of the stomach were discharged to the particular "Magen" battalion which represented their part of Germany. There they were given light duties and low residue diets based upon the accustomed diet of their part of Germany.

g. Diphtheria. The Germans have been experiencing an increased incidence of diphtheria during the past year. A fair amount of diphtheritic paralysis has followed this disease. It is the opinion of the medical consultant that low initial doses of antitoxin (10-20,000 units) were responsible for this increased incidence of paralysis.

h. Amoebic Disease. Stool-carrier studies conducted in German troops in Italy during the fall of 1944 showed an incidence of 14 percent cyst carriers. Amoebic dysentery is not uncommon and has been treated with emetine and Yatrin with good results. Amoebic hepatitis and amoebic abscess have not been very common.

i. Streptococcal and typhoid-paratyphoid infections occurred in the German Army in Italy somewhat more frequently than in the American army. The treatment of these diseases was similar to that used in the American army.

5. General Comments.

a. German rations for the staff and patients in hospitals in the Cortina area were available for about ten days more at the time of this inspection. The Consultant in Medicine was informed by the commanding officer of the 379th Collecting Company that at the end of that period, the patients in German hospitals would receive the American hospital ration, while the Medical Department staff will receive type "C" rations. If this is correct, then title III, chapter 2, article II, Treaty Series No. 846 which was proclaimed by the President of the United States, 4 August 1932, is being violated, because it is distinctly stated "The food ration of prisoners of war shall be equal in quantity and quality to that of troops in base camps." It is being argued that inasmuch as Germany did not observe the Geneva Convention, we do not have to treat their prisoners of war in accordance with the Convention. Such reasoning is specious and it should always be remembered that "two wrongs do not make a right."

b. It is the opinion of the Consultant in Medicine that our aim should be to utilize every method to get the German sick well, or if they are suffering from known chronic disease to give them a certificate of discharge for disability as soon as such a course is feasible. To this end it is therefore recommended:

(1) That our treatment directives be sent to all German hospital installations with instructions that they be translated into German and be used as the basis for treatment.

(2) That penicillin be made immediately available for the treatment of acute and chronic gonorrhea, acute syphilis and such other diseases in which the use of this antibiotic has been shown to be timesaving in the cure of disease. The present methods used by the German Medical Corps for treating gonorrhea have produced resistance to sulfonamide therapy with the result that time-consuming methods (intermittent fever therapy, prostatic massage, irrigation, etc.) are being used in the treatment of chronic infections and patients are being discharged before a *bacteriological* cure has been effected. It would seem important to use penicillin in these patients because eventually a certain number of them will return to the area being occupied by the American Army in Austria or Germany, and there will become foci of infection in the civilian population.

c. It is recommended that Colonel General Menardus be sent to Germany and be discharged from the German army at the earliest possible moment. His presence in the Cortina-Merano area is unnecessary and somewhat confusing.

In summary, it may be said that during 1943 and early 1944, the consultant in medicine frequently encountered serious problems in carrying out the

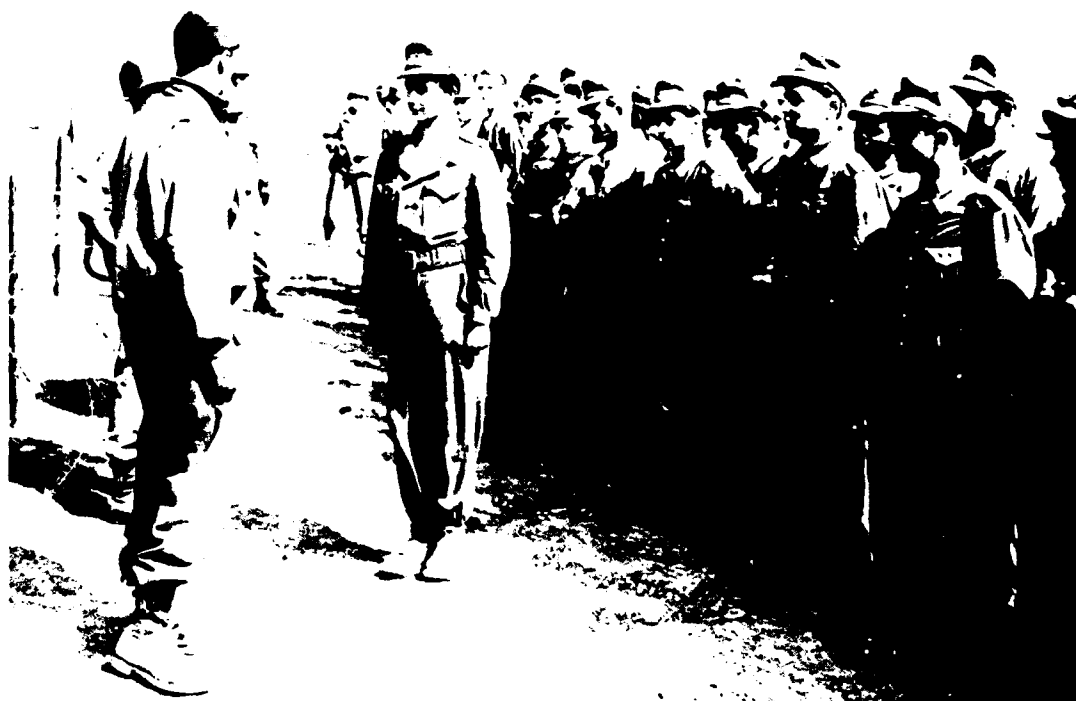


FIGURE 66. German prisoners of war, Italy, 1945.

duties specifically given to him by a verbal order of Maj. Gen. Everett Hughes, Deputy Theater Commander, NATOUSA.

General Hughes had stated unequivocally, "I want prison camps, both disciplinary and POW, run in a strict but humane fashion." At times, the level of care in prisoner-of-war camps was excellent and in full accord with these orders (fig. 66). At other times, it was considerably less good, chiefly because of thoughtless administrative practices in lower echelons. The solution of the problem was strict adherence to the Geneva Convention dealing with the treatment of prisoners of war, and the consultant in medicine, whenever inefficiencies were detected, made it his business to see that those in charge of these men fully understood their responsibilities toward them.

NUTRITION

In the course of a tour of inspection of British military hospitals made 13 to 20 January 1943, the consultant in medicine heard his first complaints concerning the monotony and unpalatability of the C ration. At the same time, complaints from American units attached to British units were heard in respect to the monotony and lack of bulk of the compote ration. However, during this tour, clinical evidence of vitamin deficiencies was not noted in

American soldiers, and the January 1943 sanitary reports did not mention vitamin deficiencies and contained few complaints about rations. The sanitary reports arriving in February and thereafter however, increasingly mentioned various inadequacies noted in the rations. These complaints were especially frequent from the Army Air Force units, which, operating in forward areas where conditions were often difficult logistically, were compelled to exist for considerable periods of time upon emergency or unbalanced rations.

It was not until the II Corps was visited in northern Tunisia, in April and May 1943, that there were bitter reports about the rations, and vitamin deficiencies were noted. Battalion surgeons reported that their men had been fed C rations for such long periods of time that they had ceased to eat them and that the continued use of these rations produced nausea, vomiting, and diarrhea. These surgeons stated also that their men were undernourished. The consultant in medicine checked upon these reports by observing and interviewing men of the 3d Battalion, 39th Infantry, and patients in the evacuation hospitals. He found himself in agreement with the battalion surgeons. During this same period, he also observed patients suffering from deficiencies of vitamin A, thiamine, riboflavin, nicotinic acid, and ascorbic acid in the evacuation hospitals of the II Corps.

The extent of undernutrition observed in the II Corps prompted the consultant in medicine, on 1 May 1943, to recommend to the Surgeon, NATOUSA, that a board of officers be appointed to ascertain the facts and make recommendations concerning the diet of combat troops in this theater. The consultant's recommendation for the appointment of a board was accepted by the Surgeon and was forwarded in the form of a memorandum to the deputy theater commander on 15 May 1943. After being circulated by the Chief of Staff to G-4 (logistics (supply)) and the quartermaster sections, where it was received favorably, the memorandum was submitted to the Deputy Theater Commander who returned it to the Surgeon, with the suggestion that the difficulty lay in the misuse of the C ration rather than the ration itself. The Surgeon then again recommended that a board of officers be appointed, but the Deputy Theater Commander negated this suggestion.

The 2-month period that elapsed between the end of the campaign in northern Tunisia and the opening of the Sicilian campaign was one of great activity along the whole North African coast and especially in the Eastern Base Section. Troops were being trained (fig. 67) for amphibious operations in this period, and their diet varied from C to fully balanced B rations. Supplies of all types were being poured into the Eastern Base Section, and there, inevitably, the B ration became unbalanced. Calorie estimates, prepared by the 56th Evacuation Hospital, demonstrated that during June, July, August, and September 1943, the average caloric value of the B ration, as issued in the Eastern Base Section, was in the neighborhood of 2,500 calories per day.

Four of the six divisions entering the Sicilian campaign had been, relatively or completely, inactive as far as combat was concerned, but the other two divisions had seen extensive service during the Tunisian campaign, during which, toward



FIGURE 67. Amphibious training.

the end, patients with clinical nutritive deficiencies had been received in hospitals of the II Corps from both divisions.

During the initial stages of the Sicilian invasions, the majority of the troops subsisted upon C and K rations (fig. 68), but, as the campaign progressed, 5-in-1



FIGURE 68. U.S. Army Field Ration K and British Ration.

and modified B rations made their appearance. This was especially true of those divisions that took the western half of the island because, in addition to rations issued to them, variety and nutritive value were increased by the capture of a certain amount of frozen beef and German field rations (fig. 69), as well as by local purchase. The troops in the II Corps which were progressing towards the northeast were not so well off, because tactical conditions were such that C and K rations frequently had to be issued, especially to combat infantry units. However, owing to the shortness of the campaign and to the fact that troop reliefs were made, local foraging was permitted, and the 5-in-1 and modified B rations were provided early, it seems likely that the nutritive status of the combat army during the Sicilian campaign was better than in any previous, or any subsequent campaign in 1943. However, at this point, that part of WD Circular No. 208, 1943 that dealt with percentage reduction of the authorized allowances for field rations based upon unit strength, was activated by section III of NATOUSA Circular No. 464, dated 29 August 1943. This move resulted in penalizing members of large units at the expense of small units and did not fulfill its anticipated purpose of saving food. In fact, the evidence at hand showed that it contributed further to the general state of undernutrition then existing in NATOUSA.

Again, following the Sicilian campaign, a period of intensive training took place, but, as B rations were used largely during this period and many of the troop units were well rested and well fed, one can conclude that the opening of the Italian campaign was made with troops in a fairly good state of nutrition. The term "fairly" is used advisedly, in view of the fact that the expeditionary-force B ration was a deficient ration, as was shown by the quartermaster board



FIGURE 69. Medical Department soldiers of 10th Infantry Division, Mt. , preparing to sample German meat and hard tack, Italy, February 1945.

project. However, as the Italian campaign evolved, the nutritive status of divisional troops, especially the infantry progressively deteriorated. This was because of (1) the longtime employment of troops in combat, (2) tactical situations that made C or K rations the sole rations feasible for use, (3) the unbalancing of the B ration as evidenced by 50 percent substitutions or eliminations on certain days, and (4) the use of a summer type B ration, which had not been changed to meet the energy requirements of continuous hard fighting and cold weather.

Thus, by the end of November 1943, while the nutritive status of Peninsular Base Section troops and service troops in armies, corps, and divisions was constantly improving, that of the combat infantry troops was progressively deteriorating. During the end of November and in December, a survey of nutrition in NATOUSA was made by Col. Paul E. Howe, SnC, Chief, Nutrition Section, Office of the Surgeon General, and Colonel Long. Gross evidence of nutritional deficiencies was observed in the course of this tour and the following recommendations were made: (1) That the percentage reduction in rations as provided for section III, NATOUSA Circular No. 164, dated 29 August 1943, be eliminated; (2) that that part of section I, par. 3, NATOUSA Circular No. 122, dated 27 June 1943, forbidding the drawing of excess rations, be eliminated; (3) that the pertinent parts of WD Circular No. 208, paragraphs 16b and c dealing with increased issues, be made effective immediately in

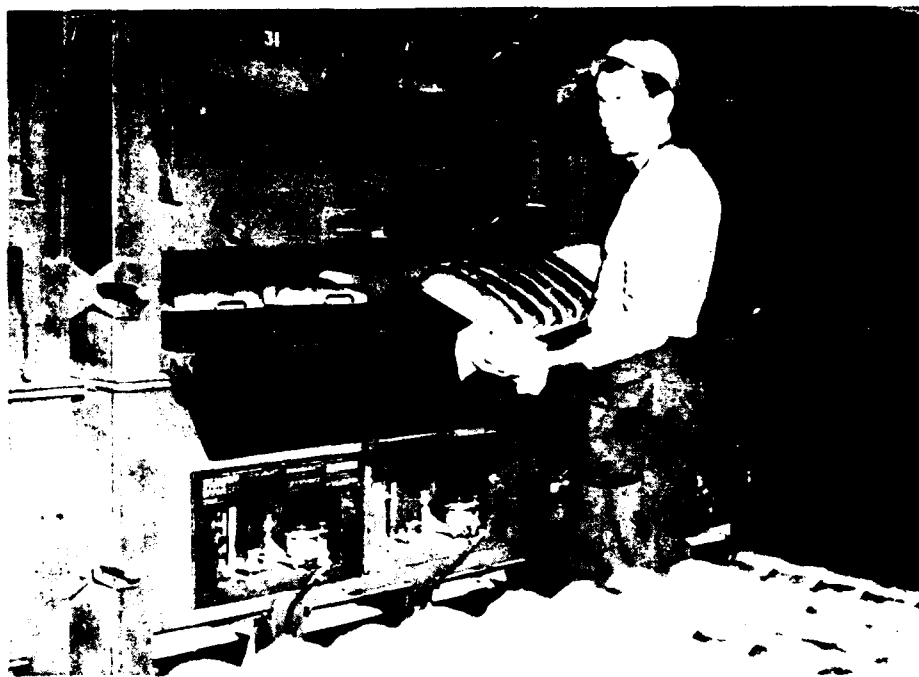


FIGURE 70. Fresh bread from 110th Quartermaster Bakery Company, Italy, January 1945.

NATOUSA: (4) that combat and other troops, who, owing to the prolonged use (3 or more days) of C, K or other nutritionally deficient rations be subjected to nutritional rehabilitation until the estimated calorie loss has been restored; (5) that monthly reports be rendered by army and base section commanders on elimination and improper substitutions within the B ration; (6) that menus be provided and that issue sheets, indicating the proper amounts of food to be drawn, be issued to all organizations drawing rations; and (7) that multivitamin capsules or tablets be issued automatically to all troops subsisting for 3 or more days upon C or K rations. These recommendations were under consideration at the end of the year. Recommendations (1) and (2) were accepted officially, and (4) was being carried out unofficially in the Fifth U.S. Army and in the hospitals of NATOUSA. The B ration was improved markedly during the last 2 weeks of December by the addition of frozen meat, poultry, bread (fig. 70), and fresh butter.

Late in May 1943, a conference group was appointed, under the chairmanship of Brigadier R. M. Hinde, O.B.E., to consider establishing an interallied common ration scale. The possibility of evolving a common ration had been contemplated for some time, and, following approval of the deputy theater commander, the chief administrative officer (British), AFHQ, had nominated this committee with the consultant in medicine as one of the two American members. The function of the committee was to consider the matter from all angles and to surmount any difficulties that might prevent the proposed scale from being put into operation.

Several sessions were held beginning 13 June 1943. At the first meeting, it was pointed out that a common ration scale would save duplication of depots as well as shipping tonnage and food supplies, both in the United States and in the United Kingdom. Further discussions made clear that the existing British scale lacked variety and many issues were too low in quantity. Brigadier Hinde called upon the medical member of the committee to submit schedules of the calories, vitamins, minerals, variety of foodstuffs, and similar items that would constitute an adequate common ration scale. This was done after a series of joint conferences and was accepted with a few minor modifications by the committee at a meeting on 8 July 1943. The proposed scale was referred to the Quartermaster Section and by it to Headquarters, Service of Supply. The latter office added a few minor changes, and in addition, suggested that a 10-day cycle and issue chart be prepared and that the ration be fed to test groups of individuals from both armies before being formally adopted. These suggestions were agreed upon by the committee on 29 July 1943. Nothing has been heard of the interallied common ration scale since that date.

Although the rations for combat troops became temporarily unbalanced during periods of intense fighting in 1944-45, situations such as existed in 1943 were rarely encountered. The nutrition of all in the theater was at a relatively high level, especially during the stabilization of combat in the high Apennines during the winter of 1944-45. The breakout into the Po Valley, with the subsequent drive towards the Alps, was so rapid and through country so relatively well supplied with food that the nutrition of the force was never a serious problem.

RECONDITIONING

The problems associated with the physical rehabilitation of sick and wounded soldiers became apparent in the late spring of 1943, when patients convalescent from various diseases and from wounds were being discharged directly to the replacement depots. It was found that many of them, although convalescent and in need of no further medical attention, were in such a poor physical state that they could not undertake the training programs then in force in the replacement depots. Accordingly, the Surgeon, NATOUSA, requested the advice of the consultants in surgery and medicine in respect to the physical rehabilitation of convalescent patients. At the direction of the consultants, Maj. (later Lt. Col.) James H. Townsend, MC, 6th General Hospital, and Capt. Lewis T. Stoneburner, III, MC, 45th General Hospital, were detailed to make a study of all convalescent and rehabilitation facilities existing in the theater. After a study of the problem in the 2d Convalescent Hospital, the Palm Beach Convalescent Camp, the 1st Replacement Depot, in numerous station and general hospitals, and in the 8th and 10th British Convalescent Depots, these officers made the following recommendations on 30 August 1943, which were favorably endorsed by the consultants in surgery and medicine and approved by the Surgeon, NATOUSA.

* * * * *

3. Conclusions.

a. It is believed that there is a clearly demonstrated need for some type of installation in this theater for the rehabilitation of men who have completed their treatment in general hospitals and station hospitals acting as general hospitals, who by virtue of their long periods of hospitalization and absence from their units, are in need of physical reconditioning and mental reorientation before undertaking the training program of replacement centers.

b. It is believed that this can be most effectively accomplished with an organization under the administration of line officers with the assistance of a suitable medical detachment and continuous liaison with the medical department.

c. An installation organized as a separate training battalion with a slightly augmented medical detachment is believed to be well suited to this purpose. It could be an independent installation, or attached to a replacement center.

d. The outline of the organization and operational program of such an installation are appended. They do not differ materially from what is already in operation at the Combat Conditioning Battalion of the 2d Convalescent Hospital, and at Palm Beach.

4. Recommendations.

a. That in each geographical center of hospitalization in this theater a rehabilitation center be established to recondition men discharged from hospitals who are to be returned to combat duty.

b. That such installations should be organized under line administration with a suitable medical detachment.

c. That professional liaison be established between hospitals, rehabilitation centers and replacement centers to insure optimum results in the functioning of the whole program.

The policy laid down in these recommendations, namely, that it was not the mission of the Medical Department to train men for combat or other army duties, was accepted by the Surgeon, NATOUSA, who, however, took no specific action upon the report of Major Townsend and Captain Stoneburner. Early in 1944, reconditioning units, whose sole purpose was to rehabilitate patients to the point where they could undergo the type of training required in the combat reconditioning companies and in the training sections of the replacement depots, were established in most station and general hospitals (figs. 71 and 72) in the theater. The efficiency of these units varied with the enthusiasm and interest of the noncommissioned and commissioned officers who were in charge of them. However, with the development of exercise tolerance as a test for cure in patients convalescent from hepatitis in 1944, the physical reconditioning program was given a boost, and it functioned in a satisfactory manner during the remainder of the life of the theater.

PROFESSIONAL EDUCATION

From the beginning of his duties as consultant in medicine in the North African theater, Colonel Long attempted to stimulate and plan the graduate education of medical officers, believing that a program of graduate education would materially assist in the maintenance of reasonable standards of medical practice within the theater. It has been noted earlier in this chapter that medical officers of service and tactical units were isolated from medical thought. In a report made to the Surgeon, NATOUSA (Deputy Surgeon, AFHQ) on 25 January 1943, the consultant in medicine made two recommendations.



FIGURE 71. Occupational therapy, 21st General Hospital, Italy, 1944.

First, every effort should be made to improve the professional standards of unit medical officers by conferences, short courses, lectures, meetings (fig. 73), and similar methods. Such programs could be carried out when divisions and units were in rest areas. The consultant staff, Medical Section, NATOUSA (AFHQ), and the staff of general, stations, and evacuation hospitals could be used as instructors. Second, all circulars, directives, and other mediums dealing with the professional aspects of patient care that might originate from the Medical Section, NATOUSA (AFHQ), should be prepared in such quantities that a copy of each might be placed in the hands of each unit medical officer.

Hospital Programs

During his first tour of all American hospitals in NATOUSA, completed in March 1943, the consultant in medicine had noted that, although the general caliber of professional work upon the medical services was excellent, the libraries in certain hospitals were not very accessible or complete, and, in some hospitals the holding of medical conferences or staff meetings had been abandoned. Upon his recommendation, Circular Letter No. 2, dated 18 March 1943, Office of the Surgeon, Headquarters, NATOUSA, was distributed to the commanding officers of all field, evacuation, station, convalescent, and general hospitals. It read as follows:

1. The Surgeon, NATOUSA, has been impressed with the high standards of professional service which exists in the army hospitals in NATOUSA, and he desires that every effort



FIGURE 72.—Reconditioning, 21st General Hospital, Italy, 1944.

be made to maintain or even increase the levels of professional practice. To this end it is suggested:

a. That hospital libraries be placed in a position where they are easily available to all members of the hospital staff and that the Office of the Surgeon, NATOUSA, be notified immediately of any deficiencies noted in medical books and journals.

b. That medical officers be encouraged to study the clinical course of interesting groups of patients with the viewpoint of collecting adequate data upon which medical and surgical reports may be based. It is suggested that completed papers be submitted to the Surgeon's Office, NATOUSA, for editing and forwarding to The Surgeon General.

c. That weekly clinical or clinical pathological conferences be held by the staffs of all hospitals in NATOUSA.

d. That when the opportunity arises members of one hospital staff will visit neighboring hospitals for the purpose of observing professional practices.

As a result of this letter, deficiencies in the libraries of hospitals were corrected, weekly medical meetings were instituted as a regular procedure in all hospitals, and papers dealing with disease in the North African theater began to be sent in for publication. Thus was initiated a continuous program of practical medical education, which lasted throughout the life of the theater.

Meetings and Societies

With the grouping and concentration of hospitals in certain areas such as Oran, Bizerte, Naples, Leghorn, and in the Fifth U.S. Army area, it was



FIGURE 73. Weekly meeting of Fifth U.S. Army medical officers at 38th Evacuation Hospital, February 1944.

only natural to expect medical officers to organize medical societies. As a result of such activities the Mediterranean, Eastern and Peninsular base medical societies were organized, and these flourished as long as the base sections existed. A particularly interesting organization was the Fifth U.S. Army medical society, which held its weekly meetings in the opera house of the palace of Caserta in the winter of 1943-44. The success of these parent organizations led to the formation of specialist groups such as the Peninsular Base Section neuropsychiatric association, which was active through 1944.

Hospital sponsored meetings and societies. The large general medical societies served a very useful purpose because the topics presented were of a practical and timely nature, and the sessions of these societies provided a common meeting ground for medical officers in the various areas. The success of these meetings led individual hospitals to sponsor medical meetings; those of the 26th General Hospital at Bari, Italy, and the 8th Evacuation Hospital when it was located near Raticosa, are worthy of comment. The 26th General Hospital functioned as the general hospital for the Fifteenth Air Force from January 1944 until June 1945, and, because of its central location within that air force, was accessible to squadron surgeons. Hence, its medical meetings were well attended and served a very useful purpose in keeping the medical officers of the Fifteenth Air Force au courant with the latest developments in medicine. The 8th Evacuation Hospital (fig. 74) conducted a series of afternoon and evening meetings for medical officers of field units that were near the Florence-Bologna road during the first 4 months

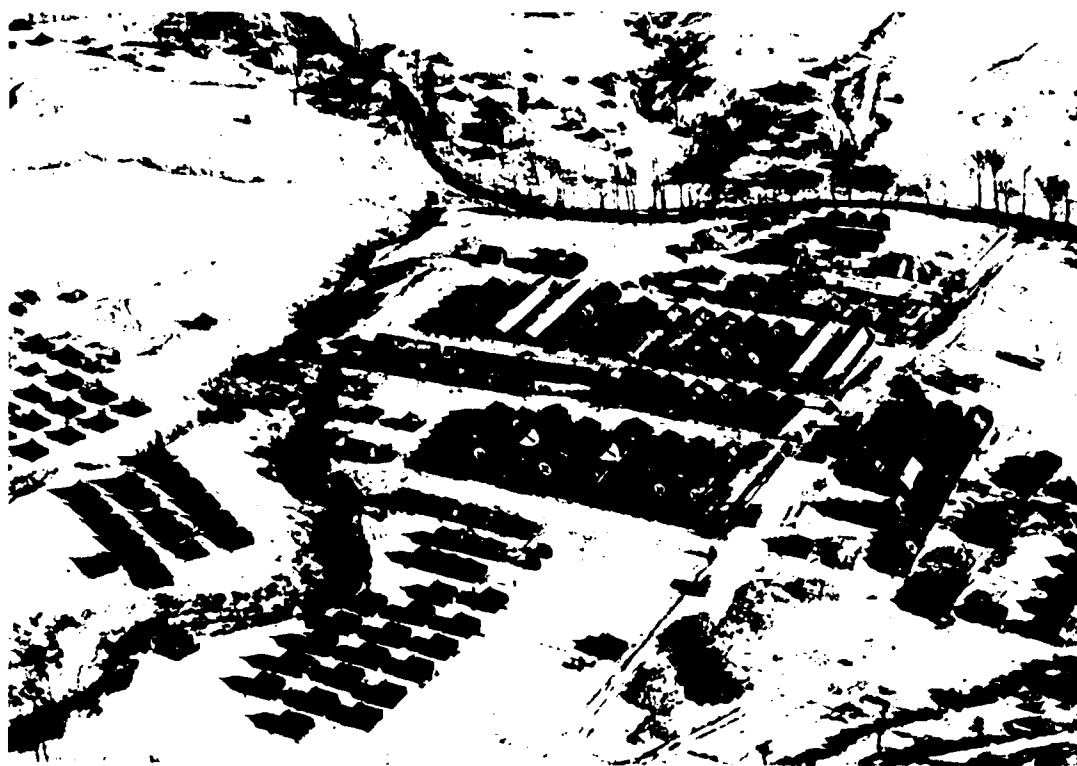


FIGURE 74. 8th Evacuation Hospital, Italy, January 1945.

of 1945. At times, the program was presented by the personnel of the 8th Evacuation Hospital; at other times, guest speakers were present. These meetings were so organized that an afternoon program of 2 hours' duration was followed by the opportunity to take a hot shower, followed by cocktails and dinner, and in the evening another scientific program was presented. Thus, the needs of both mind and body were met. The attendance at these meetings was always large.

Interallied meetings. During the life of the North African and Mediterranean theaters there were several large meetings that were interallied in scope. The first of these, organized under the aegis of the Surgeon, Mediterranean Base Section, was held in Oran, Algeria, on 6 November 1943. Owing to the geographical location of Oran, the meeting was largely attended by American and French medical officers, and papers were presented by officers of both nationalities upon subjects of current interest. An attractive feature of this meeting (fig. 75) was a series of exhibits dealing with the work of optical units, malaria survey and control units, certain aspects of medical supplies, the treatment of fractures, and other interesting subjects.

The second large medical meeting was the Interallied Medical Congress, which was held in Algiers, Algeria, 21-24 February 1944. Membership in this congress was open to medical officers of the Allied nations and to French civilian physicians in North Africa. Unfortunately, owing to the transpor-



FIGURE 75. Brig. Gen. Frederick A. Blesse and U.S. Army and Navy medical officers examine models of Tobruk splints at medical conference in Oran, North Africa, November 1943.

tation situation and the problem of billeting. American and British participation in this congress had to be limited to medical officers who were then resident in North Africa. Despite this limitation, the congress was well attended—over a thousand members registered—and the subjects of typhus, venereal diseases, malaria, dysentery, neuropsychiatric conditions, and military surgery received special attention.

The third large medical meeting was sponsored by the 26th General Hospital and was held in Bari, Italy, on 4 November 1944. The program was designed to be of current interest, and among the speakers were both British and American medical officers. Transportation to and from this meeting was mainly aerial, made possible through the cooperation of the Fifteenth Air Force and the Air Transport Command. Several hundred medical officers attended this meeting.

The fourth large meeting was organized by the 300th General Hospital in Naples and was held on 26 and 27 January 1945. The program was presented largely by the staff of the hospital, although certain papers were presented by British and other American medical officers. A feature of this meeting was the fact that most of the more than six hundred American and British medical

officers who attended were billeted in the hospital. They were transported to and from Naples by air.

The fifth and last large meeting was the conference of Army physicians, which met in Rome from 29 January to 3 February 1945. It was organized by Brigadier Boland, the British consulting physician of AFHQ. The membership was made up primarily of the officers in charge of medical divisions and the medical specialists of British, Canadian, South African, New Zealand, Indian, and Polish general hospitals and casualty clearing stations, but more than fifty chiefs of the medical services of American hospitals in the theater were invited to attend. In addition, the consulting physicians from the Middle East Force, East African Command, Persia and Iraq Force, South Africa, New Zealand Corps, Canadian Corps, and the consultant in medicine and the Surgeon, MTOUSA, were in attendance. Thus, a wide variety of opinion was represented, and the sessions in which malaria, diphtheria, infectious hepatitis, trenchfoot, amebiasis, penetrating wounds of the chest, neuropsychiatric problems, and the medical uses of penicillin were covered, were well attended, and the subjects were freely discussed. Ample time was taken out during the conference to permit visits to places of interest in Rome, an audience was granted the members of the conference by the Pope, and the delegates were invited to a wide variety of social functions. It was considered one of the most successful meetings held in the North African and Mediterranean theaters.

Rotation of Medical Officers

The problem of continuing the graduate education of field service medical officers attracted the attention of the consultant in medicine within the month after he arrived in North Africa, when he noted the paucity of opportunity for these officers to do anything resembling the practice of medicine as they had known it. It was almost impossible, because of the varying tactical situations, to place these officers in hospitals for periods of temporary duty. In May 1943, at the suggestion of the consultant in chemical warfare medicine, a flexible plan for rotating medical officers from service and combat units to hospitals was devised. The plan envisaged the replacement of all medical officers, after varying periods of combat duty, by general duty medical officers from army hospitals within the theater. This plan, which was never enunciated as official policy, had as its purpose the professional rehabilitation of medical officers who had long been removed from the practice of medicine. Initially, minor opposition was presented by commanders of the field units and the hospitals concerned, because both groups of commanders disliked giving up trained and known medical officers for unknown ones, but, when the plan began to function and its merits were understood, this opposition quickly disappeared. As a result of this program, more than three hundred service and combat unit medical officers were rotated from the field to hospital services during the existence of the North African and Mediterranean theaters.

Plans for Postarmistice Training

On 30 August 1944, the consultant in medicine initiated an action by sending to the theater surgeon a memorandum, subject: Proposed Staff Memorandum of a Plan for the Postarmistice Professional Rehabilitation in North African Theater of Operations, United States Army of Field Service and Administrative Medical Officers in Internal Medicine, which read as follows:

1. There are many medical officers in NATOUSA who have not had adequate contact with the practice of medicine for extended periods of time. This is especially true of field and administrative service medical officers, many of whom have been out of the practice of medicine, as it is commonly understood, for from 2 to 3 years. The experience of this theater indicates that medical officers who have been in the field or administrative services for a year or more require from 3 to 6 months training before they can be fully trusted with the care of patients upon the wards of station or general hospitals. To date no plan for training which will rehabilitate these medical officers in the art of taking care of patients, has been put forth either by the War Department or civilian agencies at home. It is believed that if the following plan could be made effective in NATOUSA immediately in the postarmistice period, that the morale of medical officers would be maintained and that this theater would be performing a definite service, not only to the civilian population but also to the Army as well.

2. Plan for the professional rehabilitation of medical officers in NATOUSA.

- a. Post graduate training must be carried out upon a temporary duty basis, with the student medical officers assuming definite ward responsibilities in the hospitals to which they may be attached.

- b. The period of training should be 6 weeks in duration and the program can be carried out in all General and the 7th, 23d, 182d, and 225th Station Hospitals.

- c. The primary aim of the rehabilitation program should be to refresh medical officers in the techniques of history taking, physical examination, the value of laboratory diagnostic procedures and the advances which have been made in medicine since 1940. This can best be accomplished by giving the student medical officers direct responsibility (under competent supervision) for the management of ward patients, by formal teaching ward rounds, lectures upon special subjects, X-ray conferences, clinical pathological conferences and journal clubs. The training program should concern itself primarily with general internal medicine, but special emphasis should be placed upon the newer aspects of the diagnosis and treatment of venereal diseases, modern concepts of dietary regimes, and a thorough review of indication for use and the practical application of penicillin, etc.

- d. The modus operandi could be as follows: There are approximately 100 ward medical officers in the general and station hospitals which have been listed, and there are roughly 675 field service medical officers in NATOUSA. Obviously, it is impossible to estimate how many of these officers will desire training in internal medicine. It is suggested, therefore, that upon the signing of the armistice a paragraph outlining the scope of the program be published in a NATOUSA Circular and that application for training be filed through command channels. Priority on training would be given to those officers who have been longest in field or administrative medical positions, irrespective of whether such service was in the United States or overseas. It is the consensus of opinion that from 45 to 50 medical ward officers (and as the surgical service will be light, surgical ward officers would also be available) could be placed on 6 weeks temporary duty with field units as replacements for the trainees. Additional candidates for the program, for whom replacements would not be necessary could be obtained from the administrative services. Is it estimated that from 75 to 100 medical officers could be rehabilitated at a time under such a system.

- e. In order to assure the smooth functioning of this program it would be necessary to have a "school director" attached to the Office of the Surgeon, NATOUSA. His duties

would be to select candidates and to supervise and coordinate the proposed program. This officer should be attached to the Office of the Surgeon, NATOUSA, when the armistice seems imminent, in order that the program may be started as soon as the tactical situation in the theater becomes stabilized.

This memorandum was thoroughly discussed with the Surgeon, MTOUSA, and upon his recommendation, it was decided to suspend action upon this plan until it appeared that the enemy was about to surrender.

Early in March 1945, the end of hostilities in the Mediterranean theater seemed imminent, and a committee, under the chairmanship of Col. Edward D. Churchill, MC, was formed to make plans for graduate education in the postsurrender period. This group held its first meeting on 15 April 1945, and the following recommendations were made to the Surgeon, NATOUSA.

a. A director of Professional School Service should be appointed to the staff of the Surgeon, MTOUSA, and implemented with clerical aid.

b. Authorization of courses as official War Department school courses should be secured.

c. When the program has been formulated, a circular letter or bulletin describing the program should be distributed to every medical officer in the theater.

d. General hospitals and the 7th Station Hospital should be requested to submit plans for a basic course in accord with the following general policies:

(1) Medical officers attached to a general hospital for a basic course are to be regarded as students and will not be used for any other function except in an emergency.

(2) A basic course of 6 weeks duration will be designed so that a student may enter at any time and, when essential, depart at any time.

(3) General hospitals will plan for 20-25 students each at a time; the 7th Station Hospital will plan for 7 students.

(4) Supplemental professional teaching personnel will be supplied, when available, by the director of Professional School Service. The mobile hospitals will be a source of personnel for this purpose.

(5) The course will include: clinical pathology, general medicine, general surgery, preventive medicine, and neuropsychiatry.

(6) Ward rounds in general medicine or general surgery will be conducted by a senior officer. In addition, there will be clinics, clinicopathologic conferences, X-ray conferences, didactic lectures, round-table discussions and journal club meetings.

e. The director of Professional School Service shall also arrange elective courses, usually of 2 weeks' duration, in the following: Field course in preventive medicine, (malaria control, typhus, enteric diseases, venereal disease). In general, these should follow completion of the basic course.

The Surgeon, MTOUSA, accepted the recommendations of the committee, and shortly afterwards, Lt. Col. Joseph O. Weilbaecher, Jr., MC, of the 64th General Hospital was placed on temporary duty in the Office of the Surgeon, MTOUSA, as director of professional school service. Colonel Weilbaecher immediately made a detailed study of the problem of setting up the desired courses in the general hospitals of the theater, and, at the completion of his study, he submitted a comprehensive plan for instruction over a 6-week period. This plan was accepted by the Surgeon, MTOUSA, shortly after the surrender of the enemy in Italy, but it could not be put into effect immediately because of the redeployment program. After the completion of the redeployment program early in July, it was found that the staffs of certain hospitals had been so

disrupted as to make them unavailable for teaching purposes, and in the end, it was found necessary to shift from the rather formal course that had been planned, to on-the-job training in the 33d General Hospital, Leghorn, Italy, 64th General Hospital, Ardenza, Italy, and the 300th General Hospital. Undoubtedly, some benefit was derived by the medical officers who received training in these hospitals, but the experience of the Mediterranean theater definitely showed the difficulty of organizing and carrying out postgraduate training at such a time, and it appeared that completely satisfactory programs for medical education could not be devised during periods of redeployment.

RESEARCH PROBLEMS

It became evident to the consultant in medicine early in 1943 that practical and, possibly, some fundamental contributions to medical knowledge might be made in an oversea theater of operations, if the investigative spirit that lay dormant in many medical officers was stimulated. In the course of his first tour of inspection of hospitals, interesting problems were noted in respect to the etiology of diarrhea, the significance of chronic dyspepsia in the Army, the treatment of gonorrhea, the treatment of anxiety states, and the description of exotic diseases, and medical officers were asked to send papers on these subjects to The Surgeon General.

Malaria.—The initiation of the policy of universal Atabrine therapy for the suppression of malaria in the Allied Forces offered excellent opportunities for the study of the toxicology and pharmacology of the drug, and in a report to the Surgeon, NATOUSA, dated 17 May 1943, recommendations were made regarding the possibility of making such studies.

1. The next six months are going to offer unrivaled opportunities for the study of the effects of Atabrine therapy in respect to its actual effect in suppressing malaria, the conditions under which "break throughs" occur, the value of the drug in respect to the various types of malarial parasites and the effect of terminal concentrations of the drug on the subsequent development of malaria. In addition, the use of quinine could be studied from the same point of view.

2. This same period will offer the same opportunity for studying new methods of malarial therapeutics.

3. To date all of our ideas in respect to the suppressive and therapeutic aspects of Atabrine or quinine therapy have been based upon empirical observations and there is good reason to believe that with the techniques for determining the concentrations of Atabrine and quinine in the tissues and body fluids which have been developed within the last year, notable contributions might be made from NATOUSA upon the suppression and therapy of malaria. This will also benefit our troops.

4. Physical equipment such as laboratory space, benches, etc., are readily available and unused in French civilian institutions in Algiers.

5. It has been the policy of the Surgeon General's Office to investigate special disease situations within and without the United States by civilians who are designated as consultants to the Secretary of War.

- a. The investigations of the Board for the Control of Influenza and other epidemic diseases.

- (1) Under army auspices but with civilian personnel a large laboratory has been set up at Fort Bragg.

(2) The civilian members of the various commissions have conducted extensive investigations under army auspices in the field in the United States.

b. Two members of the Virus Commission have been dispatched to Cairo to study sand fly fever and jaundice from the point of view of the causative organisms.

c. The army has sent special investigators outside the continental United States to study certain special problems since December 7, 1941. An example of this is the inspection of wounded made by Drs. I. S. Ravdin and P. H. Long at Pearl Harbor in 1941.

6. Therefore, inasmuch as the problem is pressing and of great importance and the following recommendation involves no question of War Department policy or precedent, it is strongly recommended:

a. That the theater commander urgently request that the services of Dr. James Shannon, Professor of Pharmacology, New York University, one junior assistant and four technical assistants, be made available immediately in this theater of operations and that permission be given to permit them to bring those laboratory instruments and reagents, necessary for them to accomplish their mission. Dr. Shannon is the individual who developed the methods for the quantitative determination of both quinine and Atabrine in body tissues and fluids.

b. If this recommendation meets with your approval the following radio to the War Department, attention Surgeon General, is suggested: "Unrivalled opportunities will exist in NATOUSA during the next seven months for the scientific study of suppressive and therapeutic activities of quinine and Atabrine from the pharmacological and toxicological points of view. Special experimental studies upon this problem can be arranged easily with French civilian medical authorities. Laboratory space is available. Information gained from these studies will be most valuable in its application to the personnel of this theater. It is urgently requested that Dr. James Shannon of New York University, one designated associate, and four technicians be sent immediately under a civilian status to NATOUSA to study these problems. Such technical laboratory instruments and reagents needed for their mission should be brought with them. Because of the urgency of these problems priority of transportation is requested."

The Surgeon accepted these recommendations and communicated informally with the Chief, Preventive Medicine Service, Office of the Surgeon General, concerning the possibility of carrying out such studies in the North African theater. Unfortunately, the reply to this communication was mis-addressed and did not arrive until September, when it was too late to do anything about such studies.

Dysentery. In late spring of 1943, a major outbreak of flyborne bacillary dysentery occurred in the North African theater. Careful studies upon the types of micro-organism responsible for this outbreak were made in the Second Medical Laboratory in Casablanca, French Morocco, the 151st and 69th Station Hospitals in Oran, Algeria, and the 73d Station Hospital at Constantine, Algeria, with the result that not only was the etiology of the diarrhea in North Africa clarified but also hitherto unrecognized species of the *Shigella* family were described. These studies were especially helpful in counteracting the French point of view that bacillary dysentery was uncommon in North Africa.

The arrival of the 15th Medical General Laboratory (fig. 76) in the fall of 1943 accelerated the tempo of investigation in the theater because such a unit could function as the clearinghouse for research activities and specifically because the stimulating presence of Major Mallory was felt by all. The

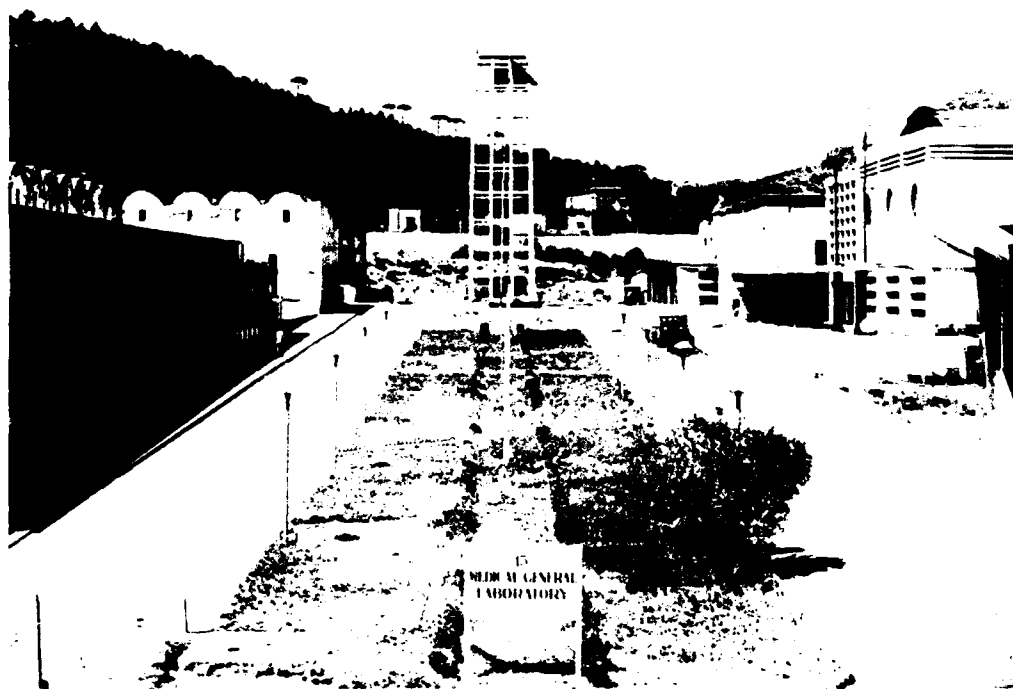


FIGURE 76. 15th Medical General Laboratory, Italy, 1945.

laboratory was established in Naples early in 1944 and from that time on served very usefully as the center of research activities within the theater.

Early in 1944, the Surgeon, NATOUSA, created a board of officers to evaluate proposals for the investigation of various problems and to stimulate research in the theater. The members of this board were the medical inspector, the consultant in surgery, the commanding officer of the 15th Medical General Laboratory, the consultant in medicine, and the preventive medicine officer. It was the opinion of the consultant in medicine that although the Medical Research Advisory Board served a useful purpose in screening certain suggestions for research and in bringing the weight of its authority to bear when necessary to accomplish certain things, it rarely fulfilled its mission of stimulating research. Certain of the individual members did, but certainly not the board as such.

During 1944-45, certain examples of investigation involving laboratory studies were as follows:

Hepatitis. Studies on infectious hepatitis were instituted on a large scale under the direction of Colonel Barker, early in 1944, and were continued until July 1945. These investigations included comprehensive investigations on the etiology, epidemiology, pathology, clinical course, prognosis, and treatment of this disease.

Atabrine.—In the summer of 1944, an extensive study was made by Capt. (later Maj.) John C. Ransmeier, MC, of the 300th General Hospital, on the relation of the concentration of Atabrine in the blood to alleged breakthroughs in the course of the use of Atabrine for the suppression of malaria.

Liver function.—During 1944–45, numerous medical officers studied the value of various tests of liver function, not only in patients ill with infectious hepatitis, but also in those with malaria, syphilis, tonsillitis, primary atypical pneumonia, bacillary dysentery, and in normal individuals.

Trenchfoot.—Studies were carried out in the winter of 1944–45 upon the capillary beds and upon temperature variations in the skin of individuals suffering from trenchfoot.

Other studies.—In addition to these investigations, many excellent clinical papers were written dealing with malaria, dysentery, boutonneuse fever, sandfly fever, arthritis, rheumatic fever, primary atypical pneumonia, leishmaniasis, and other diseases, and the treatment of gonorrhea and syphilis with penicillin, in the North African and Mediterranean theaters.

EDITORIAL DUTIES

Every effort was made by the consultant in medicine to provide the physicians in MTOUSA with the latest information concerning advances being made in medicine. In this attempt, it was found that the reports received from the National Research Council and the Committee on Medical Research, Office of Scientific Research and Development, were especially useful because they were valuable sources of restricted information upon such subjects as malaria, dysentery, insecticides, and penicillin. These reports were frequently reprinted in circular letters within the theater and were greatly appreciated by all medical officers. The WD technical bulletins, medical, were also valuable sources of information, but, unfortunately, in the Mediterranean theater, these bulletins frequently did not arrive until after the need for the advice contained in them had passed.

In 1943, it became evident that a means other than circular letters for disseminating information of current value to medical officers was greatly needed in the North African Theater of Operations. After considerable thought and discussion, in which Col. Earle G. Standlee, MC, Deputy Surgeon, NATOUSA, was the leader, it was decided to produce a monthly medical journal, the *Medical Bulletin of The North African Theater of Operations*. An editorial board consisting of the chiefs of the various divisions and sections in the surgeon's office, and under the chairmanship of the Surgeon, NATOUSA, was established. Capt. Carl D. Clarke, SnC, was appointed managing editor. The success of this publication (the title of which was changed on 1 December 1944 to the *Medical Bulletin of the Mediterranean Theater of Operations* was instantaneous, and there can be but little doubt that it was a leading educational stimulus, as copies reached every medical officer in the theater.

In July 1944, following conferences with various chiefs of medical services, the consultant in medicine decided to recommend to the Surgeon, NATOUSA, that comprehensive monographs covering diseases of importance in the theater be prepared by individual medical officers, or boards of medical officers, in order that the collected opinion of medical officers concerning these diseases might be recorded. In a memorandum to the Surgeon, NATOUSA, dated 9 September 1944, subject: Clinical Description of Disease in Respect to Management, Disposition and Prognosis in NATOUSA, the following recommendation was made:

It is recommended that comprehensive reports on the problems concerned with the management, disposition and prognosis of the following diseases in NATOUSA be prepared by the following medical officers. It is furthermore recommended that immediately after the armistice is signed or before that occurrence if necessary, these medical officers be placed on D.S. [detached service] in order that they may collect the necessary data on various disease entities and assemble it without being disturbed by administrative or clinical duty.

This recommendation received favorable consideration from the Surgeon, NATOUSA, and, at his suggestion it was decided that two reports would be made in each instance. A preliminary report, which would be prepared in the fall of 1944, and a final report, which would be written after the war ended in Italy. This decision was activated by the following letter, signed by the Deputy Surgeon, NATOUSA, dated 16 October 1944.

Subject: The Detailing of Medical Officers to Assist in the Preparation of Clinical Monographs on Disease Problems in NATOUSA.

To: Surgeon, Peninsular Base Section, APO 782 (Thru: Surgeon, COMZONE, NATOUSA, APO 750)

1. It is desired that clinical monographs be prepared on the major disease problems with which this theater has been concerned. The objective is to have considered, authoritative statements in respect to these various problems available before the termination of medical activities in NATOUSA.

2. The purpose of these monographs is to describe accurately the diagnostic methods employed, clinical course, treatment and the results thereof, and the disposition of patients ill with certain diseases in NATOUSA. Special attention should be paid to the problems faced in dealing with these diseases under the military conditions which have existed in the Theater since one aim of these reports is to differentiate clearly those factors influencing the management of disease in an active theater from those operative under garrison or civilian conditions.

3. To facilitate this undertaking, it is requested that the designated medical officers compile and edit the available data upon specified diseases. These medical officers will receive the fullest cooperation in their endeavors, and furnished facilities such as secretarial aid, etc., necessary in the preparation of reports.

4. In the instance of certain diseases, two or more officers from different hospitals, will constitute a board to collaborate upon the reports in order that a broad critical analysis may be obtained. They will confer whenever necessary with each other or with medical officers in the Theater upon their particular problems. The senior officer will act as chairman of the board. Direct communication between members of the group or any other medical officer who possesses pertinent data is authorized.

5. As far as is possible, the reports should be based upon factual data and not upon impressions. To this end, all necessary records will be made available to the authors of

the various monographs. Use should be made of the pertinent laboratory data accumulated by the 15th Medical General Laboratory and 2d Medical Laboratory. Due credit will be given for the contributions of these laboratories.

6. When more than one officer is concerned in the preparation of a report, the individual experiences of each officer will be recorded first, and the final report will represent the consensus of opinion of the board. This will naturally require a certain amount of professional give-and-take

7. Travel orders will be issued for such inspection of records, conferences, etc., as is necessary in the opinion of the authors, for the completion of their assigned missions.

8. It is desired that these monographs be completed within 60 days after designation of the responsible officers, and one original and four carbon copies forwarded through technical channels to the Surgeon, NATOUSA. These reports will be classified "Restricted."

9. Diseases and authors.

a. Common respiratory diseases.

Primary atypical pneumonia.

Streptococcal sore throats.

Lt. Col. D. W. Myers, O-437966, 7th Station Hospital

Major E. D. Matthews, O-436735, 24th General Hospital

b. Common diarrhoeas.

Bacillary dysentery.

Major H. W. Hurewitz, O-1700449, 73d Station Hospital

c. Malaria.

Major P. B. Bleecker, O-355049, 225th Station Hospital

Major F. S. Perkin, O-470551, 17th General Hospital

Major H. H. Golz, O-318515, 182d Station Hospital

d. Infectious hepatitis.

Lt. Col. M. H. Barker, O-409083, 12th General Hospital

Major R. B. Capps, O-386360, 12th General Hospital

Major F. W. Allen, O-257301, 15th Medical General Laboratory

e. Tuberculosis.

Lt. Col. D. S. King, O-413283, 6th General Hospital

Capt. G. T. McKean, O-428031, 17th General Hospital

f. Dermatological conditions.

Major C. B. Kennedy, O-403771, 64th General Hospital

Major R. N. J. Buchanan, O-404505, 300th General Hospital

Major R. C. Manson, O-330183, 45th General Hospital

Major R. E. Imhoff, O-479552, 61st Station Hospital

g. Arthritis and rheumatic fever.

Major C. L. Short, O-178366, 6th General Hospital

Major E. F. Bland, O-397996, 6th General Hospital

h. Peptic ulcer.

Major N. F. Fradkin, O-430698, 33d General Hospital

Major D. P. Head, O-230608, 26th General Hospital

Major C. J. W. Wilson, O-445327, 24th General Hospital

i. Infectious polyneuritis.

Major J. W. Johnson, Jr., O-468994, 300th General Hospital

j. Allergic diseases.

Major H. H. Golz, O-318515, 182d Station Hospital

Capt. A. C. Kalisch, O-1695328, 182d Station Hospital

k. Sandfly fever.

Lt. Col. William A. Reilly, 59th Evacuation Hospital

Major Roberto F. Escamilla, 59th Evacuation Hospital

Col. Perrin H. Long, Medical Section, A.F.H.Q.

- l. Venereal disease.
Capt. R. I. Gettman, O-1693729, 23d General Hospital
- m. Leishmaniasis.
Major Alfred Kranes, 6th General Hospital.

For the Surgeon:

E. Standlee
Colonel, M. C.,
Deputy Surgeon

The initial monographs were forwarded to the Chief Consultant in Medicine, Medical Consultants Division, Office of the Surgeon General, in February 1945, for suggestion and criticism and were then rewritten and brought up to date after the surrender of the enemy in Italy. This was done in compliance with the directive contained in the letter of the Surgeon, MTOUSA, dated 7 February 1945, subject: Clinical Monographs on Disease Problems in MTOUSA.

MEDICAL INTELLIGENCE

Early in 1943, when faced with the problem of the medical care of prisoners of war, Colonel Long realized that there was practically no source of medical intelligence in the theater. With this in mind, he made the following report to the Surgeon, NATOUSA:

1. There is available in NATOUSA very little information regarding enemy immunization programs, medical field service, medical practices and medical supplies. The possession of such information would be of value in the planning of future operations and in the medical care of prisoners of war. It is also conceivable that information or drugs might be picked which would aid the AUS in improving certain aspects of medical practice.

2. It is therefore suggested that an intelligent trained young medical officer be attached immediately to the G-2 Section, II Corps, and that he be instructed:

- a. To interview prisoners of war in order to obtain medical information from them.
- b. To inspect, photograph and describe captured enemy medical installations.
- c. To inspect, describe and photograph enemy medical equipment and supplies.
- d. To report the existence, general type of, and location of captured enemy medical supplies.
- e. To send samples of new instruments, drugs, etc., promptly to The Surgeon, NATOUSA.
- f. To file reports of his findings with G-2, NATOUSA.

The Surgeon, NATOUSA, did not take these recommendations very seriously and did nothing about them. When this became evident, the consultant in medicine made arrangements with the Documents Branch, G-2 Section, AFHQ, to have sent to him all the captured enemy documents that related to any field of medicine. This arrangement worked out fairly successfully, and some useful information concerning the incidence of typhus and tetanus, the prophylaxis of malaria and immunization against disease was obtained. However, it was always felt that much more valuable material could have been obtained if a properly trained medical service officer had been placed in charge of medical intelligence.

CHAPTER IV

European Theater of Operations

William S. Middleton, M.D.

Part I. Chief Consultant in Medicine ¹

HISTORICAL NOTE

In 1942, the organizational pattern of the Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA (European Theater of Operations, U.S. Army), took its basic design from the organization set up for the American Expeditionary Forces of World War I in France. Circular No. 2, dated 9 November 1917, Office of the Chief Surgeon, American Expeditionary Forces, had listed eight directors of the Professional Services to serve as an element under the Division of Hospitalization. Four months later, it was disclosed that The Surgeon General of the U.S. Army had, on 11 November 1917, proposed a Consultants Service of three divisions. However, he expressed his willingness to support the plan of the American Expeditionary Forces, and, eventually, 7 of the 8 directorships of Professional Services were established in the Departments of Medicine and Surgery.²

Unusually happy was the selection of the two leaders of this movement: Brig. Gen. John M. T. Finney in surgery, and Brig. Gen. William S. Thayer in medicine. From the outset, however, the geographic dissociation of the directors, located at Neufchateau, from the General Headquarters located at Chaumont, 45 miles away, bespoke difficulties that were exaggerated when General Headquarters moved to Tours. On 18 April 1918, Col. William L. Keller, MC, was made director of Professional Services. Although his appointment afforded leadership and a measure of cohesion, his assignment to the general headquarters accentuated the physical detachment of the officers whose work he supervised. The unfortunate term "director" was changed by definition to "consultant" by Circular No. 25, dated 5 May 1918, Office of the Chief Surgeon, American Expeditionary Forces. The pattern of organization was most ambitious and was designed to be carried through at all echelons of command; namely, army, corps, and division.

In the Medical Division, under General Thayer at headquarters, there were two senior consultants in general medicine, Col. Thomas R. Boggs, MC, and Maj. Franklin C. McLean, MC; a senior consultant in infectious diseases, Col. Warfield T. Longcope, MC; a senior consultant in neuropsychiatry, Col. Thomas W. Salmon, MC; a senior consultant in general medicine, poisoning

¹ Dr. Middleton, who is the author of part I, served as editor and reviewer for the remainder of the chapter.

² The Medical Department of the United States Army in the World War. Administration, American Expeditionary Forces. Washington: U.S. Government Printing Office, 1927, vol. II, p. 351.

by deleterious gas, Lt. Col. Richard Dexter, MC; a senior consultant in cardiovascular diseases, Lt. Col. Alfred E. Cohn, MC; and a senior consultant in tuberculosis, Lt. Col. Gerald B. Webb, MC.

As might be anticipated, this comprehensive plan, idealistic in its conception, failed at many points through patent sources of weakness. Communication was difficult and mobility limited. As late as 2 September 1918, in a communication to the Chief Surgeon, American Expeditionary Forces, General Finney and General Thayer indicated their inability to control the distribution of skilled personnel. This fundamental defect sharply curtailed the usefulness of the consultants and led to an almost overwhelming sense of frustration. Without sympathetic cooperation at the highest levels, both within the Medical Department of the Regular Army and within the command, the potential of the consultants in fulfilling their mission was not well exploited.

As an observer of the activities of the Professional Services at close range in World War I, the following inherent faults became apparent to the author: (1) Overorganization; (2) concentration of highly skilled personnel at consultant levels; (3) detached leadership; (4) lack of cohesive attack; (5) difficulties in transportation, leading to immobilization; (6) inadequate professional and military rapport; and (7) insufficient time to correct these errors of organization and operation.

EVOLUTION OF MEDICAL CONSULTATION SERVICE

With the World War I experience as background, the opportunities and the responsibilities of the Medical Consultation Service, Office of the Chief Surgeon, Headquarters, ETOUSA, in World War II, stood in sharp relief. In London, as the Army Medical Directorate Consultants Committee to the Director General of the Royal Army Medical Corps, were gathered some of the outstanding men in British medicine. As advisers to the Royal Canadian Army Medical Corps, there were four leaders in the Canadian profession. The combined experience of these Allies was available at all phases of planning and activity in ETOUSA. Their advice and assistance were invaluable, and many pitfalls were avoided through their sustaining counsel.

Organization

On 13 July 1942, Lt. Col. (later Col.) William S. Middleton, MC (fig. 77), reported as Chief Consultant in Medicine, Office of the Chief Surgeon, Headquarters, ETOUSA, then located at Cheltenham, England. On 21 July 1942, Col. James C. Kimbrough, MC (fig. 78), Director, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, proposed to set up the following four separate divisions of consultants: Medicine, surgery, neuropsychiatry, and venereal disease control. Colonel Middleton indicated certain practical and functional objections to the separation of neuropsychiatry and venereal disease control from medicine. On 25 July 1942, Colonel Middleton conferred with Col. (later Maj. Gen.) Paul R. Hawley, MC, Chief Surgeon,



FIGURE 77.—Col. William S. Middleton, MC, Chief Consultant in Medicine, Office of the Chief Surgeon, ETOUSA.

ETOUSA, and urged surveys of the British and Canadian medical situations, with particular reference to the physical, tactical, medical, and educational programs in these respective services. At this conference, an adaptation of the British and the Canadian experiences to the medical needs of the U.S. Army in the European theater was urged to avoid duplication on one hand and the loss of identity on the other. In discussing the educational program for the theater, the improvement of medical services for the troops was the objective. Past efforts had fallen short of the mark, owing to a failure to reach the medical officers most in need of instruction. The interchange of medical officers of company grade on the staff of general hospitals with those in line duty was proposed at this conference.

In the eventual plan of organization, Colonel Kimbrough included, under the chief consultant in medicine, senior consultants in the following subspecialties: General medicine, gas defense, acute infectious diseases, cardiology, tuberculosis, gastroenterology, dermatology, nutrition, neurology, and psychiatry. With the concurrence of Colonel Kimbrough, nutrition was later made the responsibility of the Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA. In London, on 11 August 1942, Colonel Middleton met with Col. (later Brig. Gen.) Elliott C. Cutler, MC, Chief Consultant in Surgery, Office of the Chief Surgeon, Headquarters, ETOUSA, and Col. (later Brig. Gen.) Charles B. Spruit, MC (fig. 79), Deputy Chief Surgeon, ETOUSA. In this conference, Colonel Cutler expressed a desire to have his senior consult-



FIGURE 78. Col. James C. Kimbrough, MC (left) and Col. William S. Middleton, MC.

ants as a cabinet to advise him at all times within the subspecialties of surgery, including X-ray and anesthesiology. In light of the World War I experience and from a personal evaluation of the requirements of ETOUSA, Colonel Middleton outlined a plan that would maintain at headquarters a minimum of senior consultants in the medical subspecialties and a majority in a dual relationship with primary responsibilities as chiefs of medical services in general hospitals and a subsidiary function as advisers to the theater at large in their respective fields. Upon conferring with Colonel Hawley, both chief consultants were advised that they would be held responsible for their respective functions, regardless of the manner of implementation. As anticipated, with the evolution of the medical picture in the theater, neuropsychiatry and dermatology (when venereal diseases were included in the latter) constituted areas that required the full time of the senior consultants for direction and advice. Accordingly, the senior consultants for neuropsychiatry and dermatology were attached to headquarters.

With the approval of Colonel Hawley, a list of specialists in the United States to serve as senior consultants in the respective subdivisions of medicine in the European theater was submitted to the Surgeon General's Office on 16 August 1942. The Surgeon General's response, received on 22 October 1942, left no doubt as to further procedure, stating: "It is suggested that Consultants be obtained from men already assigned to the European Theater. Many of the



FIGURE 79. Col. Charles B. Spruit, MC.

men listed in the basic communication hold key positions in civilian life, and cannot be obtained for the Army. Many others, if they can be declared non-essential, are required for consultant positions in the United States."

On 25 August 1942, Lt. Col. (later Col.) Lloyd J. Thompson, MC, assigned as Senior Consultant in Neuropsychiatry, ETOUSA, reported to the theater. The Surgeon General likewise named Lt. Col. (later Col.) Donald M. Pillsbury, MC, as Senior Consultant in Dermatology, ETOUSA, and he reported for duty on 5 December 1942. On 25 December 1942, Lt. Col. (later Col.) Theodore L. Badger, MC, Chief, Medical Services, 5th General Hospital, located near Salisbury, England, was recommended as Senior Consultant in Tuberculosis, ETOUSA. Colonel Badger was the first medical officer to have the distinction of serving in the dual capacity anticipated for all senior consultants.

Plans for Gas Defense

To Colonel Middleton, as one who had served with troops in World War I and to whom the ravages of gas warfare were familiar, the necessity for sound organization to meet such a threat weighed heavily. Opportunities to study the situation in the British Army were afforded through the courtesy of the Royal Army Medical Corps, through the good offices of Colonel Walker and Captain Hill, RAMC. On 10 August 1942, Colonel Middleton was granted every facility of the Royal Army Medical Corps School of Instruction at Boyce

Barracks, Aldershot, England. Tables of organization and plans of instruction for gas defense were carefully reviewed. The realistic attitude of the school officials indicated a sharp appreciation of the limitations in therapy. For example, oxygen therapy was to be given to the "blue" subjects of phosgene poisoning but not to the "gray."

Colonel Walker proposed to take from 10 to 15 U.S. Army medical officers in each class, rather than the existing quota of three, as the pressure of the military situation increased. On 4 November 1942, Colonel Middleton attended the course at the M. S. Factory, Randle, near Liverpool, where the program included a demonstration of the manufacture of toxic agents. The preventive measures among workers and detailed data as to the treatment of the several forms of toxic gases, including bromobenzyleyanide and benzylcyanide, phosgene, lewisite, and other arsenic-containing toxic agents, were discussed. Doctors Chiesman, Ferrie, Wilkinson, and Stopford-Taylor and Mr. Phillips afforded a most instructive day.

Meanwhile, the key position of gas defense officer in the Office of the Chief Surgeon, Headquarters, ETOUSA, remained vacant in spite of Colonel Middleton's importunities. When Lt. Col. (later Col.) Perrin H. Long, MC, was transferred to General Hawley's office on 20 November 1942, he was assigned to duties of Acting Senior Consultant in Chemical Warfare Medicine, ETOUSA. With characteristic energy, he lent every effort to the orientation and organization of the available information in an unfamiliar field, until his transfer to the North African theater on 18 December 1942. At this time, the presence of Comdr. (later Capt.) George M. Lyon, MC, USN, in the naval office of the U.S. Embassy in London, was fortuitous. A student of gas warfare and gas defense for many years, Commander Lyon brought recognized authority to this field. His cooperation with the Army and assistance during this period illustrates one of the strongest justifications for the unification of the Armed Forces. Finally, Col. William D. Fleming, MC, the long-awaited gas defense officer, reported for duty on 23 February 1943. Three days later, in deference to Army protocol, Col. Oramel H. Stanley, MC, Deputy Surgeon, Headquarters, Service of Supply, ETOUSA, indicated that Colonel Fleming had been assigned directly to General Hawley as assistant surgeon in charge of gas defense. This function was thereupon removed from the organizational pattern of the Medical Consultation Service. The gas casualty kit assembled by Colonel Fleming is shown in figure 80.

Dual Functions

With these minor readjustments, the ultimate plan of organization of the Medical Consultation Service, ETOUSA, was completed by the addition of Lt. Col. (later Col.) Gordon E. Hein, MC, Chief, Medical Service, 30th General Hospital, located near Mansfield, England, as Senior Consultant in Cardiology, ETOUSA; Lt. Col. (later Col.) Yale Kneeland, Jr., MC, Chief, Medical Service, 2d General Hospital, Headington, Oxford, England, as Senior Consultant in

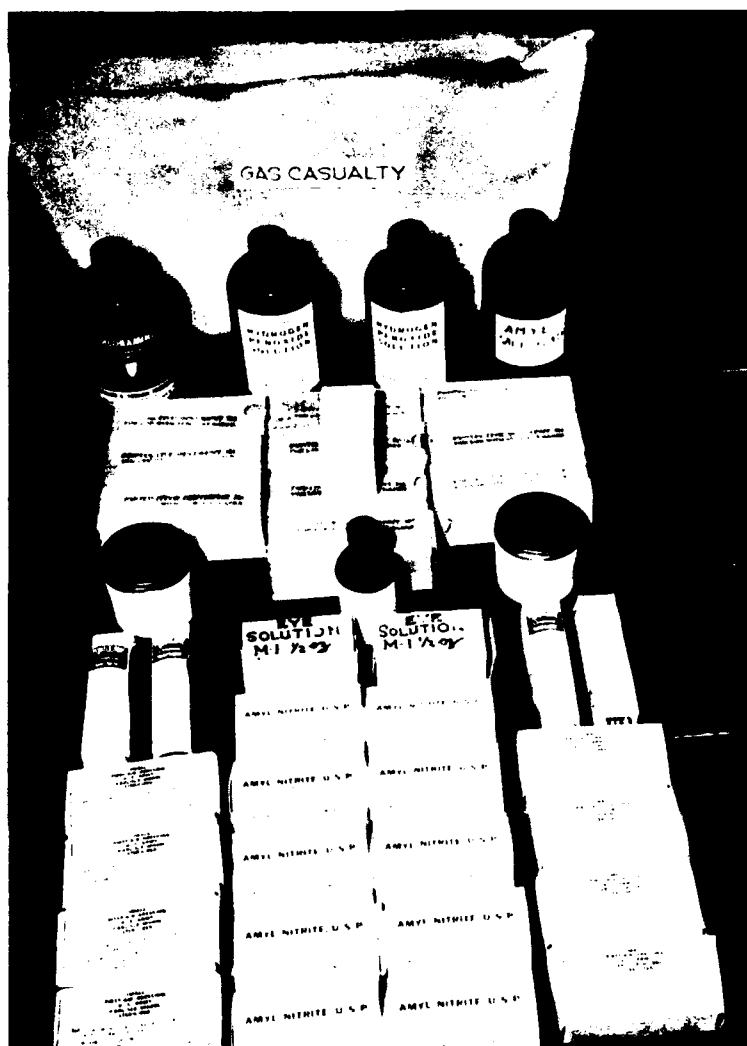


FIGURE 80. ETO gas casualty treatment kit.

Infectious Diseases, ETOUSA; and Maj. (later Col.) Ralph S. Muckenfuss, MC (fig. 81), Commanding Officer, General Medical Laboratory A, as Director, Medical Research, ETOUSA. Colonel Badger continued to function in the dual capacity of Chief, Medical Service, 5th General Hospital, and Senior Consultant in Tuberculosis. With the growth of the theater, the basic pattern was maintained, always with the thought of utilizing the senior consultants in dual capacities, where possible. As the need developed, whether in hospital centers, base sections, or a major area such as the United Kingdom, the senior consultants in infectious diseases, cardiology, and tuberculosis continued to serve in two distinct roles. The primary responsibilities of these senior consultants to a hospital or a larger administrative unit (hospital center, base section, or major area) in no way interfered with their important function of directing the theater policy within their respective specialties.

The effectiveness of any plan can be established only by the trial of experience. As stated, the administrative load in neuropsychiatry and dermatology (including venereal disease) was anticipated. Colonels Thompson and Pillsbury, operating from headquarters, discharged their onerous duties with distinction by dint of painstaking planning and assiduous effort. The early occurrence of a serious problem in the incidence of primary atypical pneumonia led the Chief Surgeon to establish a committee, composed of Colonels Kneeland and Muckenfuss and Lt. Col. (later Col.) John E. Gordon, MC, Chief, Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA, to study this problem. This group was continued as the Advisory Committee on Infectious Diseases to coordinate the mutual effort in this area. In the interest of professional coverage for consultation in isolated units, the temporary

FIGURE 81.—Col. Ralph S. Muckenfuss, MC, Director of Medical Research, ETOUSA.



expedient of regional consultants was invoked on 21 May 1943.³ Seventeen such consultants in medicine were named from the chiefs of fixed hospitals. The plan of base section consultants was first established in North Ireland Base Section by the appointment of Colonel Badger. With the evolution of the military program in the United Kingdom, the next phase of the Medical Consultation Service, ETOUSA, involved the movement of the following senior consultants: Colonel Kneeland to the Southern Base Section, Colonel Hein to the Western Base Section, and Colonel Badger to the Eastern Base Section.⁴ Eventually, base section consultants were assigned to the United Kingdom (fig. 82), Brittany, Normandy, Oise, and Delta Base Section. The Brittany Base Section had a very short life, and its medical consultant, Col. O. C. McEwen, MC, was given command of a hospital. As time passed, hospital center consultants were named in 15 centers—7 in the United Kingdom, 8 on the Continent. Medical consultants in each army afforded the direct channel of communication with the field. The names and assignments of the medical consultants who served in ETOUSA are listed in appendix A (p. 829).

³ Circular Letter No. 89, Office of Chief Surgeon, Headquarters, ETOUSA, 21 May 1943, subject: Regional Consultants.

⁴ NOTE.—The hospital center development soon made a single medical consultant for the United Kingdom a more effective agent for coordination of these groups.—J. B. C., Jr.



FIGURE 82. Staff of the Medical Section, Headquarters, United Kingdom Base, England, February 1945. Col. Joseph R. Shelton, MC, Chief, Operations Division; Col. Frank L. Stinchfield, MC, Chief, Rehabilitation Division; Col. Einar C. Andreassen, MC, Chief, Operations Division; Brig. Gen. Charles B. Spruit, MC, Surgeon, United Kingdom Base; Col. Joseph H. McNinch, MC, Executive Officer, and concurrently Chief, Medical Records Division, Office of the Chief Surgeon, ETOUSA; Maj. George S. Ude, Chief, Chemical Warfare Medicine; Lt. Col. Ralph T. Costed, MAC, Chief, Personnel Division; Lt. Col. Margaret Schafer, ANC, Chief, Nursing Division; Lt. Col. Wayne Hayes, DC, Chief, Dental Division; Lt. Col. John H. Watkins, SuC, Assistant Chief, Medical Records Division, Office of the Chief Surgeon, ETOUSA; Lt. Col. Benjamin H. Sullivan, Jr., MC, Assistant Executive Officer; Maj. Claude M. Eberhart, MC, Chief, Preventive Medicine Division.

Channels of Communication

The use of official channels was required in all matters pertaining to military or tactical procedure. With the support of General Hawley, direct communication in purely professional matters was encouraged. By the expedient of direct professional communication, the simplified system of decentralized control afforded prompt information regarding disease trends, therapeutic innovations, and pertinent medical data, which might have been long delayed had use of regular military channels been required. In the European theater, the chief consultant in medicine and his senior consultants had direct communication with the base section, hospital center, and army consultants. This arrangement reduced the obstructive factors in dissemination to a minimum and assured prompt and adequate rapport in all matters medical. Not infrequently, the advantage was centripetal rather than

centrifugal since General Hawley's office, through this medium, was constantly in touch with all medical echelons of the theater.

The scheme of organization did not extend beyond the level of the field army into the corps and divisions as had been planned in World War I. Although there had been early designs in this direction, it was found inexpedient and ineffective to carry the plan beyond the army level. However, through the army medical consultants, an effective medium of exchange existed on a reciprocal plane. Through 5 army consultants, 15 hospital center consultants, and ultimately 5 base section consultants, the senior consultants in medicine and the chief consultant in medicine found ready and cooperative professional communication.

The necessity for this decentralization becomes apparent in view of the existence of over 200 fixed-hospital units in the theater. Furthermore, with the OVERLORD movement, Colonel Middleton and the headquarters-based senior consultants, Colonel Thompson and Colonel Pillsbury, were transferred to France, when the Office of the Chief Surgeon, Headquarters, ETOUSA, moved to Valognes, and later to Paris (fig. 83) and Versailles. At this time, the direct responsibility for the direction of the Medical Consultation Service in the United Kingdom devolved upon Colonel Kneeland. Under his immediate supervision came the organization and operation of the medical services within the total of 140,000 beds, represented by the fixed hospitals in the United Kingdom after D-day.

GENERAL MORGAN'S VISIT TO EUROPEAN THEATER

The support of the Medical Consultation Service, ETOUSA, extended through the Chief Surgeon to the staff of The Surgeon General of the Army. In addition to the official interchanges of the Medical Department, informal professional communication was encouraged between the members of the staff in Washington, D.C., and their respective associates in the Zone of Interior and in the oversea theater. Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General, utilized continuously this expedient of informal communication as a medium for reciprocal advice. This ready exchange of professional information redounded to the improvement of medical service in the European theater. General Morgan's leadership gave intimate direction to the many major developments.

General Morgan visited the European theater for a tour of inspection from 7 February to 21 March 1945 (fig. 84). A summary of the tour was made on 28 March 1945 by Colonel Middleton to General Hawley, as follows:

General Morgan was afforded the opportunity to observe military medicine in four armies, under field conditions. In three of these armies he followed the line of evacuation from the battalion aid post [station] to the evacuation hospital. Typical fixed installations of the Communication Zone were visited on the Continent and in Great Britain. Particular pains were taken to cover the entire range of facilities from tented units to units housed in buildings of every degree of adequacy. The medical organization of the several echelons was covered in detail by qualified members of the staff. Clinical subjects of special interest to General Morgan, such as cold injury, hepatitis, malaria and "field" nephritis, were



FIGURE 83. -- Avenue Kleber, Paris, France, showing section of buildings occupied by Office of the Chief Surgeon, ETOUSA.

demonstrated in adequate numbers to meet his requirements. Through the cooperation of the Senior Consultants in Psychiatry and Dermatology, special facilities in these fields were demonstrated to General Morgan. Through Colonel Diveley and Colonel Stinchfield, similar opportunities were afforded for the study of the program in physical rehabilitation (fig. 85). The complete cooperation of the administrative and clinical divisions of all echelons of the Medical Department made this tour possible.

The Medical Consultation Service profited immeasurably from the first-hand counsel of General Morgan on his European tour of duty.

CONFERENCES OF CHIEFS OF MEDICAL SERVICES

Colonel Middleton initiated periodic conferences of the chiefs of medical services, in the interest of the coordination and consolidation of medical practice within the fixed hospitals of the Communications Zone. The first of these conferences was held on 25 March 1943 at Cheltenham. Fourteen of the sixteen chiefs of medicine in fixed hospitals in the theater at that time were in attendance. Representatives from the Office of the Chief Surgeon, Headquarters, ETOUSA, included Colonel Fleming, Medical Gas Defense Officer; Colonel Kimbrough, Director, Professional Services Division; Lt. Col. (later Col.) James B. Mason, MC, Chief, Operations and Training Division; Col. Joseph

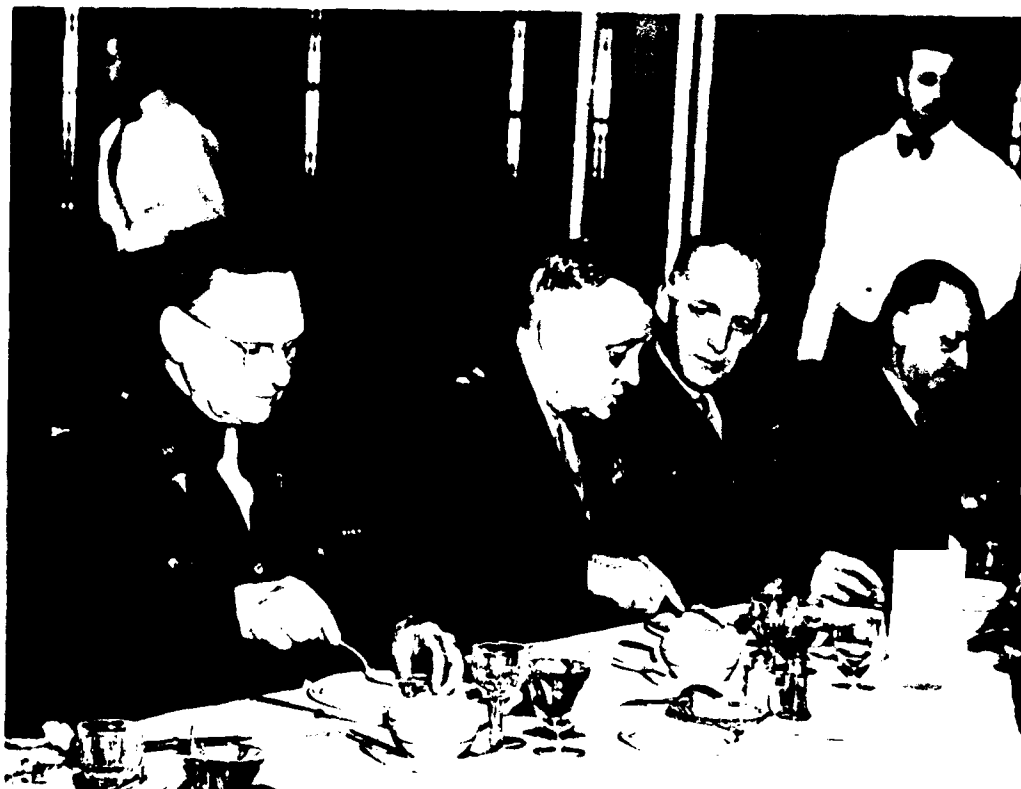


FIGURE 81. General Morgan, second from right, on visit to ETO. Others (left to right)—Colonel Kimbrough, General Hawley, and Colonel Middleton, Hotel George V, Paris, France.

H. McNinch, MC, Chief, Medical Records Division; Colonel Pillsbury, Senior Consultant in Dermatology; Colonel Thompson, Senior Consultant in Neuropsychiatry; and Major Muckenfuss, Commanding Officer, General Medical Laboratory A. There were detailed discussions on the following subjects: Gas defense; records; laboratory service; functions of the chiefs of medical services; distribution and utilization of medical personnel; current clinical problems in the theater; clinical procedures in communicable diseases; syphilis; shock; supply problems, including drugs, special diets, and equipment; disposition of patients; convalescent hospital facilities; evacuation and transportation of patients; educational programs; professional relations; and military responsibilities. Mimeographed transcripts of the proceedings were circularized to the hospitals of the theater and to the headquarters staff.

The second conference of the chiefs of medical services was held at Headquarters, ETOUSA, on 30 July 1943. The chiefs of medical services of 22 fixed installations and the following representatives of General Hawley's office were present: Colonel Spruit, Deputy Chief Surgeon; Col. Edward M. Curley, VC, fig. 86, Chief, Veterinary Service; Colonel Fleming, Gas Defense Officer; Colonel Gordon, Chief, Preventive Medicine Division; Colonel Kimbrough, Director, Professional Services; Col. David E. Laston, MC, Chief, Personnel



FIGURE 85. Convalescent patient undergoing obstacle course training at 203d Station Hospital, Stoneleigh Park, England.

Division; Colonel McNinch, Executive Officer; Col. Walter L. Perry, MC, Chief, Finance and Supply Division; Colonel Thompson, Senior Consultant in Psychiatry; Lt. Col. John K. Davis, MC, Hospitalization Division; Colonel Mason, Chief, Operations and Training Division; Colonel Pillsbury, Senior Consultant in Dermatology; and Colonel Muckenfuss, Director, Medical Research. The subjects considered were milk supply; fever therapy; intensive arsenical therapy of syphilis; anesthesia; laboratory services; current clinical problems of the theater, including respiratory infections, infectious mononucleosis, primary atypical pneumonia, poliomyelitis, mumps, encephalitis, and allergy; administrative problems, particularly involving the cooperation among hospitals; special training of nurses and enlisted men; and disposition problems. Colonel Curley presented an analysis of the problem of bovine tuberculosis in Great Britain which was timely and revealing. The presence of representatives from the several divisions of General Hawley's office led to an open forum, with most profitable discussions of such subjects as plans for special hospitals, availability of special equipment, supply and procurement of nonstandard drugs, nomination for special schools, proposed medical bulletins, and records.

By 1944, the theater had grown to such an extent that it was necessary to divide the third conference of the chiefs of medical services into two sections. The first, held on 26 January 1944, included the chiefs of the medical services

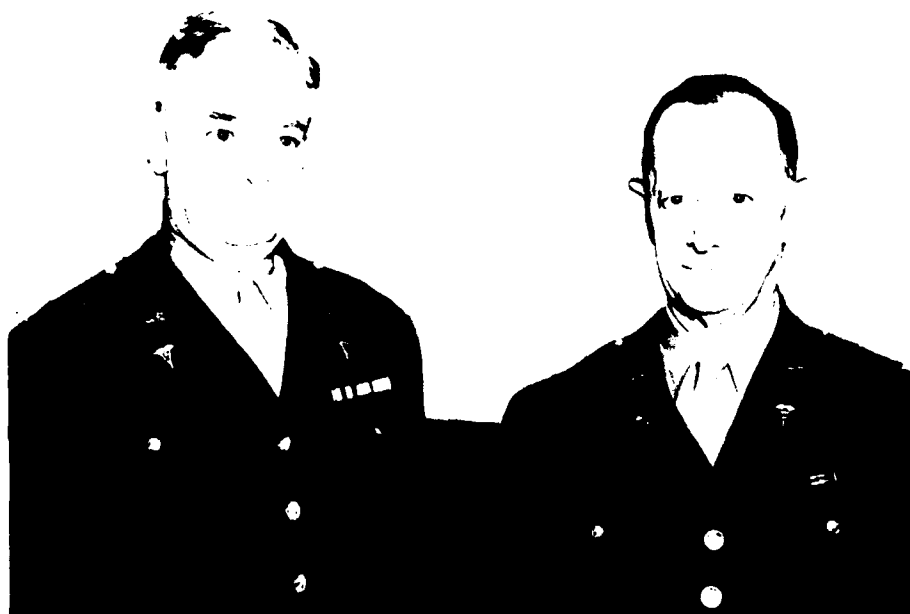


FIGURE 86. Col. Edward M. Curley, VC (left), and Col. William S. Middleton, MC.

of the hospitals in the Eastern, Western, Central, and North Ireland Base Sections. The second, held on 2 February 1944, was attended by the chiefs of the medical services from the hospitals of the Southern Base Section. At the two meetings, 70 chiefs of the medical services of the respective hospitals or their representatives were in attendance. The following representatives of General Hawley's office took active part in the proceedings of these sessions: Col. J. C. Parnell, MC, Chief, Hospitalization Section; Col. Rex L. Diveley, MC, Senior Consultant in Orthopedic Surgery; Colonel Fleming, Medical Gas Defense Officer; Colonel Gordon, Chief, Preventive Medicine Division; Colonel Kimbrough, Director, Professional Services Division; Colonel McNinch, Executive Officer; Col. W. L. Perry, Chief, Supply Division; Colonel Thompson, Senior Consultant in Psychiatry; Col. W. D. White, DC, Chief, Dental Service; Lt. Col. Kenneth D. A. Allen, MC, Chief Consultant in Radiology; Lt. Col. G. D. McCarthy, MC, Hospitalization Division; Colonel Muckenfuss, Director of Medical Research; Colonel Pillsbury, Senior Consultant in Dermatology; Lt. Col. J. C. Rucker, MC, Chief, Personnel Division; Lt. Col. A. Vickoren, MC, Chief, Operation Division; Capt. William G. Craig, MAC, Personnel Division; Capt. Claude M. Eberhart, MC, Preventive Medicine Division; Capt. H. E. Gannon, MC, Supply Division; and Capt. M. D. Switzer, MC, Medical Records Division.

In opening these sessions, Colonel Middleton outlined the organization of the medical service on a functional basis. The subjects considered were delegation of duties, training, clinical duties, consultation; clinical problems,

with the report of progress in the experimentation on the prophylaxis of acute upper respiratory infection, pneumococcal infection, typhus fever, sulfonamide-resistant gonorrhea (penicillin therapy, fever therapy); intensive arsenical therapy of syphilis; neuropsychiatric problems, including alcoholism; disposition of tuberculous patients; certain laboratory problems; outpatient department; rehabilitation; and the conduct of professional meetings. In the open forum, Vincent's stomatitis, disposition, detachment of patients, and evacuation received due consideration. The Records Division, Office of the Chief Surgeon, Headquarters, ETOUSA, made a special appeal for the accuracy of diagnostic nomenclature and stressed the importance of maintaining forms and of careful paperwork in support of statistical analyses, as well as in the soldiers' interest to establish the service connection of disabilities. X-ray supplies and equipment received full attention. Air transportation and evacuation between Northern Ireland and the United Kingdom and between the United Kingdom and the Zone of Interior were discussed. The deliberations of the earlier meetings led to the promulgation of a memorandum concerning policies of procedure for chiefs of medical services, which proved both opportune and effective.

The conferences of the chiefs of the medical services had clearly established their extreme usefulness. By the same token, it had also become evident that further similar conferences would prove unwieldy; hence, subsequent meetings of this nature were set up on a base section level. The first of these was held on 5 May 1944, in the Southern Base Section under the leadership of Colonel Kneeland. With the further development of the theater and the attendant restrictions on transportation, these conferences were eventually limited to the hospital center level. All senior consultants, base section consultants, and army consultants were invited to these meetings, and an opportunity for the free discussion of plans and problems was afforded to members of General Hawley's office in attendance.

INTER-ALLIED RELATIONSHIPS

The rapport of the medical officers of the U.S. Army, in general, and the staff of the Chief Surgeon, ETOUSA, in particular, with the medical profession of Great Britain was conspicuous. General Hawley and Colonel Kimbrough cultivated this relationship by every attention to social and professional amenities. Every courtesy was shown to Colonel Middleton and his senior consultants. Early in the evolution of the basic plan for the Medical Consultation Service, ETOUSA, Maj. Gen. Sir Alexander H. Biggam, RAMC, and Col. Lorne C. Montgomery, RCAMC, Chief Consultants in Medicine for the British and Canadian Armies, respectively, in every way helped to expedite the organizational plans of the U.S. Army in the European theater. Colonel Middleton regularly attended the monthly meetings of the Medical Subcommittee of the Army Medical Directorate Consultants Committee to the Director General of the Royal Army Medical Corps, under the chairmanship of General

Biggam. The following distinguished clinicians constituted the Medical Subcommittee: General Biggam, Consultant Physician; Brigadier D. B. McGrigor, Consultant Radiologist; Brigadier J. R. Rees, Consultant Psychiatrist; Brigadier G. W. B. James, Consultant Psychiatrist; Brigadier F. D. Howitt, Consultant in Physical Medicine; Brigadier George Riddoch, Consultant Neurologist; Brigadier T. E. Osmond, Consultant Venereologist; Brigadier R. M. B. MacKenna, Consultant Dermatologist; Brigadier J. A. Sinton, Consultant Malariologist; and Brigadier Sir Lionel Whitby, Consultant in Transfusion and Resuscitation (fig. 87).

In the deliberations of this group of British clinicians, free and uninhibited discussion of mutual problems was encouraged. The regular meetings of the Army Medical Directorate Consultants Committee were held the day after the meetings of the Medical Subcommittee, under the leadership of Lt. Gen. Sir Alexander Hood. Although these sessions were important, the proceedings represented a duplication of the activities of the medical and surgical subcommittees. Hence, regular attendance, while invited, was deemed redundant.

Under the chairmanship of Prof. John A. Ryle, the Interservices Medical Consultants Committee was organized. Representatives of the Royal Army Medical Corps, Royal Navy, Royal Air Force, Royal Canadian Army Medical Corps, Emergency Medical Service, the U.S. Army, and the U.S. Navy met in Kelvin House, London, at regular intervals to discuss mutual problems. Air Commodore Alan Rook served as its secretary. Upon the resignation of Professor Ryle, Surgeon Rear Admiral R. A. Rowlands, R.N., occupied the chair.

FUNCTION OF MEDICAL CONSULTANT

From the standpoint of the Army, the fundamental aims of the Medical Department are (1) to establish and maintain high standards, both physical and mental; (2) to prevent disease and disability from trauma; and (3) to limit morbidity and mortality in disease and trauma, both battle and nonbattle. Within military circles, there can be no question as to the supreme importance of preventive medicine in reaching such objectives. In the European theater, in General Hawley's office, there was a complete meeting of the minds between the Professional Services Division and the Preventive Medicine Division. Few days passed without an interchange of information between Colonels Gordon and Middleton. As a rule, the propinquity of offices made such contacts very simple. For a short period, the detachment of the Preventive Medicine Division to London while the Professional Services Division remained in Cheltenham was immediately felt as a distinct dislocation between two divisions with a common objective. The interlocking interests of these divisions should always be borne in mind in future planning in the interest of the health of a command. Their missions are inseparable, and they can operate effectively only when interdependent.

The medical care of the patient is secondary only to the prevention of disease and disability. The former responsibility fell clearly within the pur-



FIGURE 87. British guests at regular series of banquets held by General Hawley and consultants for distinguished members of British medical profession. Thirlestaine Wall, Cheltenham, England, 2 April 1943. Left to right: Colonel Middleton, Brigadier Sir Lionel Whitby, Sir Edward Melanby, General Hawley, Brigadier McGrigor, and Colonel Cutler.

view of the Medical Consultation Service, ETOUSA. In the interest of the best possible medical care, the primary function of the medical consultants must perforce be clinical. At an early stage in the evolution of the theater, Colonel Middleton made clinical rounds of each hospital in the United Kingdom at least once a month. During this early period, calls for personal professional consultations multiplied these clinical exposures many times. Whenever possible, Colonel Middleton used such contacts as a teaching outlet. Aside from the obvious professional aspect, these recurring consultations with young clinicians ultimately paid dividends in the assessment of their capabilities for growth and, in turn, aided Colonel Middleton in making recommendations for personnel assignment when new and understaffed units flooded the theater. With the mounting troop lift and accelerated hospitalization program (ultimately a total of 259,725 beds, of which 183,550 were in fixed hospitals), the routine of monthly clinical rounds, which had been so profitable, was necessarily modified by decentralization. In place of a single consultant for the theater, a base section or a hospital center consultant made periodic and requested professional visits in the area of his responsibility, with distinct advantage to the service to the individual soldier.

In General Hawley's office, the Medical Records Division sent regular reports to the Professional Services Division, which had an obvious interest in

the current incidence and trends of disease. The weekly statistical reports of deaths presented an unusual challenge. These weekly lists were checked for preventable diseases by Colonel Middleton. By direct correspondence with the chief of the medical service in the hospital reporting such deaths, a copy of the complete clinical record was obtained. General Medical Laboratory A submitted a duplicate set of the histologic sections of the pathologic materials from such subjects to Colonel Middleton, so that all points of discrepancy might be reconciled. The situation having been reconstructed from the available evidence, an analysis with appropriate observations was forwarded to the responsible medical chief. As a rule, this constructive procedure was well received. Although its value is impossible of estimation, undoubtedly, the result was intangible dividends in the improved care of the sick in this theater.

PERSONNEL MANAGEMENT

The confidence of the Chief Surgeon, ETOUSA, in the mission of the consultants was evident in his mandate to them to offer direct advice to his Personnel Division on the movement of highly trained medical personnel. In turn, the Personnel Division depended implicitly upon the consultants of the Professional Services Division for such counsel. In the interest of the best medical service under existing conditions, there must be an optimal utilization of the available personnel. Obviously, extreme inequalities existed in many of the hospitals assigned to the Communications Zone. In the early phases of development, disproportionate professional strength was evident, particularly in the affiliated units. With the increasing demand upon the decreasing pool of medical officers in the Zone of Interior, this situation was eventually reversed. As already intimated, the existing professional assets of the theater had been carefully cataloged by Colonel Middleton on the basis of personal and professional observations in the wards of the existing units. Upon the arrival of new hospitals in the theater, personal interviews and staff conferences were arranged to assess the professional qualifications and capabilities of all medical officers on the medical services. Alarming discrepancies, both quantitative and qualitative, were disclosed as the reserve of medical officers in the United States was depleted. Some idea of the magnitude of the problem may be gathered from the fact that, in 1944, Colonel Middleton visited and interviewed the officers of the medical sections of 108 general and 11 station hospitals from the Zone of Interior and 4 general and 2 station hospitals from MTOUSA (Mediterranean Theater of Operations, U.S. Army). Colonel Kneeland likewise surveyed a group of these new units. To meet obvious deficiencies of skilled personnel in these hospitals in 1944, 58 new chiefs of medical services were assigned from the reservoir of qualified and tried internists of the affiliated units of the European theater and those which had been transferred from MTOUSA.

The place of the affiliated hospital (fig. 88) in the reserve pattern of the Medical Department has been subjected to sharp criticism in certain quarters. Clearly, superior professional qualifications may be anticipated in these units.



FIGURE 88. First "home" of 30th General Hospital, Mautsfield, Nottinghamshire, England, affiliated unit
from University of California, Berkeley, Calif.

At times, the loyalty to the mother institution may overshadow the greater need of the military situation. A natural pride in organization may bias the judgment of responsible officers, but, upon a clear presentation of the problem, cooperation in the release of highly qualified internists seriously required in other units was willingly made in the European theater. Without this source of support, the medical services of the fixed hospitals of this theater would have presented a strange mosaic of professional adequacy, ranging from superb to impossible, and the standards of medical care would have fluctuated immeasurably from one hospital to another. In this relation, the Personnel Division of General Hawley's office can not be too highly commended for their cooperation. Never was a recommendation for the movement of a medical officer in the interest of better care for the soldier made by the medical consultants without prompt compliance.

The professional interchange of the consultants of General Hawley's office with medical officers of the armies was intimate. Frequently, advices in medical matters from the field initiated inquiry or appropriate action at Headquarters, ETOUSA, to the ultimate advantage of the U.S. soldier, while, conversely, medical information flowed freely from Headquarters, ETOUSA, to the field. In the movement of personnel, the prerogatives of the army were assiduously respected. Usually, in General Hawley's office the Professional Services Division, upon the request of an army consultant in medicine for personnel to meet certain medical needs of army units, would advise the army surgeon of its willingness to arrange, through the Personnel Division, for replacements from fixed hospitals of the Communications Zone. As mutual confidence was established, at times the army surgeon, through the intermediation of the Professional Services Division, sought the transfer of medical officers from his echelon to fixed hospitals for the better utilization of their special skills.

In his first conference with General Hawley on 25 July 1942, Colonel Middleton emphasized the importance of the continuity of medical care throughout all echelons of the medical service. In the interest of sustained professional efficiency and, in turn, improved medical service to the troops, an exchange of officers of company grades from the field units with officers of similar rank in fixed-hospital units was proposed. With General Hawley's support, conferences were held in early August 1942 with Col. Max G. Keeler, MC, Commanding Officer, 5th General Hospital, Lt. Col. (later Col.) Mack M. Green, MC, Surgeon, North Ireland Base Section, and Col. Charles E. Brenn, MC, Surgeon, V Corps (Reinforced), relative to the implementation of such exchanges on a temporary basis. Colonel Brenn expressed his categorical objection to such a movement on the basis of the inevitable loss of medical officers from the field to the hospitals. Opposed to this viewpoint was the obvious bilateral advantage in the professional improvement of the medical officer from the field and the cultivation of an understanding of the medical problems of the field on the part of officers on exchange from the fixed hospitals. A pilot plan was initiated in the North Ireland Base Section between the 5th General Hospital and tactical units in training in Northern Ireland. These temporary

exchanges were well received and presented proof of the predicted bilateral advantage. As a result, this basic plan was given general application in the theater in the interest of the professional advancement of the medical officers and the medical care of the soldier.⁵

A situation similar to the medical drought experienced by officers with field units was encountered in the medical officers of the Eighth Air Force. Indeed, medical officers attached to the dispensaries and scattered units of the Eighth Air Force became extremely dissatisfied with their professional detachment. As a result of conferences with Col. (later Maj. Gen.) Malcolm C. Grow, MC, and Col. (later Maj. Gen.) Harry G. Armstrong, MC, a program of rotation of medical officers from the Eighth Air Force, not to exceed 10 per month, to fixed hospitals in the United Kingdom was arranged to begin 20 April 1943. In the judgment of Colonel Armstrong, after certain early unfortunate experiences, the exchange of similar numbers of officers of company grade from the general hospitals to the Eighth Air Force without indoctrination was deemed unwise. The assignment of Eighth Air Force representatives was, therefore, unilateral. Although the plans were sound and although the Professional Services Division in General Hawley's office made continuous efforts to maintain the flow of medical officers, operation difficulties and passive resistance limited the success of the program.

In a similar vein, an entirely different approach to the maintenance of clinical interest of medical officers in the field was attempted. Perhaps one of the most stultifying experiences for medical officers with field medical units is the necessity for the transfer of all seriously ill patients from tactical units to fixed hospitals for definitive medical care. Immediately upon such a movement, an interruption of the primary professional interest of the medical officer with the tactical unit occurs. Also, the opportunity for clinical contact commonly afforded through visits to the hospital of transfer is not available in the Army because either the tactical situation, transportation, or command policy may make such sporadic efforts impractical. To meet this situation, the post-card Form 306, Follow-up Card (Medical) was devised.

The medical officer of a line or detached unit merely wrote his address on the front of this medical followup card and the name of the patient in whom he was interested on the reverse side. Pinned to the emergency medical tag or placed in the jacket of the field medical record, this medical followup card was filled out by the first medical officer rendering definitive care and mailed to the interested medical officer in the forward unit. The information on the card included the diagnosis, necessary clinical and laboratory findings, treatment rendered, disposition made, and any recommendations. General Hawley and Colonel Middleton conducted educational programs indicating the importance of maintaining this centrifugal influence of the hospital units of the theater. The utilization of this very significant expedient extended to mobile hospitals evacuating to fixed hospitals and to station hospitals evacuating to general

⁵ Annual Report, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 1943.

hospitals. In short, this expedient established a channel of medical or professional communication that afforded information as to the care and disposition of evacuated patients and that could not otherwise have been obtained.

EDUCATIONAL PROGRAMS

Air Force Field Service School

The educational programs were the function of the Operations and Training Division of General Hawley's office. The Professional Services Division was called upon to assist in planning and implementing such programs. Under the leadership of Colonel Armstrong, the Eighth Air Force developed the Eighth Air Force Provisional Field Service School at High Wycombe, England. At the request of Colonel Grow, on 6 and 13 October 1942, Colonel Middleton presented 3-hour lectures on tropical medicine. Thereafter, the topics usually covered were the common cold, influenza, pneumococcal and atypical pneumonia, and the sulfonamides. With appropriate changes in subject matter and at intervals lengthening to semimonthly and monthly, Colonel Middleton continued to participate in this program until the discontinuance of the school in the first week of May 1944. Not only did this teaching opportunity provide excellent rapport with the headquarters staff and medical officers of the Eighth Air Force but it also served to emphasize the vital requirement of the Air Force group for a broader clinical outlet.

Medical Field Service School

On 8 September 1942, with Colonel Cutler, Colonel Middleton studied the prospects of medical teaching in the Army Medical Field Service School at Shrivenham (fig. 89). The program for clinical instruction as outlined by Lt. Col. George D. Newton, MC, was deemed inadequate for the needs of the theater. Actual participation in this area was delayed, and it was not until 22 March 1943 that Colonel Middleton gave his first lectures. The initial 4 hours of lectures for medical officers were reduced to 2 hours. One hour was allotted for lectures to nurses. Topics of current medical interest in the theater, such as respiratory infections, meningococcal infections, infectious hepatitis, and rickettsial diseases, were discussed at these monthly sessions. Particular attention was given to the dignity of the sick call. In the lecture to the Army Nurse Corps representatives at the school, particular attention was given the service, functions, and responsibilities of the Army nurse. The psychology of the sick and wounded was discussed, and due emphasis was given to the role of the Army nurse as the medical intermediary for the tending medical staff.

The Army Medical Field Service School continued its classes at Shrivenham until 13 October 1944. In the spring of 1945, it resumed operation near Étampes, France (fig. 90). With the altered tactical situation, the schedule



FIGURE 89. Formation of student medical officers, Army Medical Field Service School, Shrivenham Barracks, England.

of instruction was accelerated. This educational effort, primarily conceived by Colonel Mason (fig. 91), was directed toward the improvement of the professional opportunities for medical officers of tactical and detached units. Its successful implementation depended in a large measure upon administrative efforts of Maj. (later Lt. Col.) Bernard J. Pisani, MC (fig. 92), and Capt. (later Lt. Col.) Kenneth Smith, MC, who were charged with the immediate direction of the school. From time to time, the exigencies of service led to a diversion from the primary function of these courses; namely, the instruction of medical officers of tactical and detached units. In spite of these minor defections, this overall plan may well be counted a major contribution of the theater to the improvement of medical care of the soldiers through the education of medical officers.

Professional Rehabilitation Following Cessation of Hostilities

As early as 18 December 1943, in a memorandum to General Hawley, Colonel Middleton had proposed a plan for professional rehabilitation. This plan envisioned the reciprocal advantages of the transfer of medical officers from tactical units to fixed Army hospitals and to civilian institutions and practice in Great Britain and on the Continent after the war. Upon the cessation of hostilities, the Operations and Training Division in General Hawley's office evolved an extensive program of medical education. In addition to the decentralized plan for independent courses at the several



FIGURE 90. Medical Field Service School on the Continent, Étrampes, France, spring 1945.

hospital centers, an intensive educational program was planned for the Mourmelon area near Rheims, under the leadership of Col. Sam Seeley, MC. Colonel Middleton proposed a preceptorial plan under leaders in internal medicine in Great Britain. This program received the support of General Hawley and his Operations and Training Division. Upon personal solicitation, a number of the representative internists of Great Britain and Northern Ireland agreed to cooperate in this important enterprise. Indeed, a few medical officers in the U.S. Army were so assigned, but all of these thoughtfully conceived plans



FIGURE 91.—Lt. Col. James B. Mason, MC.

fell short of their goal or were actually abandoned in the turmoil of redeployment in the summer of 1945. In retrospect, all of these educational plans were sound and worthy of support.

Specialty Board Certification

At first glance, the certification of the medical officers in the specialty boards might appear beyond the interest or purview of the Medical Consultation Service. However, qualified medical officers who were denied the right of examination and certification by reason of military service, particularly in an overseas theater of operations, had a reasonable basis for a sense of discrimination. As secretary of the American Board of Internal Medicine, Colonel Middleton felt a serious responsibility in attempting to remove this potential source of irritation. On 19 April 1942, the American Board of Internal Medicine authorized regional oral examinations under the supervision of a member of the board "to meet the convenience of men in the Armed Forces," and, on 10 June 1944, the board took the official action that "while on active duty, Colonel William S. Middleton, MC, USA, and Captain William S. McCann, MC, USN, be authorized to conduct special oral examinations for eligible candidates wherever they are." This special authorization was unusual, particularly in view of the termination of the legal tenure of office of Colonel Middleton as of 30 June 1944. Under the authority so vested, the oral ex-

FIGURE 92.—Maj. Bernard J. Pisani, MC.



amination of candidates for certification by the American Board of Internal Medicine was arranged at the mutual convenience of the examinees and guest examiners. The following guest examiners cooperated willingly in this enterprise:

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| <p>Lt. Col. Benjamin I. Ashe, MC, 1st General Hospital.</p> <p>Lt. Col. Wardner D. Ayer, MC, 52d General Hospital.</p> <p>Lt. Col. Theodore L. Badger, MC, 5th General Hospital.</p> <p>Lt. Col. Elton R. Blaisdell, MC, 67th General Hospital.</p> <p>Maj. Donald J. Bucholz, MC, 93d General Hospital.</p> <p>Lt. Col. E. Murray Burns, MC, 46th General Hospital.</p> <p>Lt. Col. Augustus H. Clagett, Jr., MC, 90th General Hospital.</p> <p>Col. Cyrus J. Clark, MC, 32d General Hospital.</p> <p>Lt. Col. Sander Cohen, MC, 40th General Hospital.</p> <p>Lt. Col. Stanley C. W. Fahlstrom, MC, 108th General Hospital.</p> <p>Lt. Col. Frederick W. Fitz, MC, 70th Station Hospital.</p> <p>Lt. Col. Carl H. Fortune, MC, 49th Station Hospital.</p> <p>Lt. Col. Gordon E. Hein, MC, 12th Hospital Center.</p> <p>Maj. Henry B. Kirkland, MC, 110th General Hospital.</p> | <p>Maj. George L. Leslie, MC, 95th General Hospital.</p> <p>Maj. Arthur S. Mann, MC, 91st General Hospital.</p> <p>Lt. Col. Richard M. McKean, MC, 36th General Hospital.</p> <p>Maj. Norman L. Murray, MC, 186th General Hospital.</p> <p>Maj. Arthur D. Nichol, MC, 93d General Hospital.</p> <p>Maj. Christopher Parnall, Jr., MC, 19th General Hospital.</p> <p>Maj. Frank Perlman, MC, 124th General Hospital.</p> <p>Maj. Herbert W. Rathe, MC, 347th Station Hospital.</p> <p>Capt. Bernard D. Rosenak, MC, 49th Station Hospital.</p> <p>Lt. Col. Donald C. Wakeman, MC, 217th General Hospital.</p> <p>Lt. Col. Bernard A. Watson, MC, 36th General Hospital.</p> <p>Maj. Herbert B. Wilcox, MC, 2d General Hospital.</p> <p>Maj. Carl R. Wise, MC, 2d General Hospital.</p> |
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A total of 113 candidates were examined, and 4 candidates were examined twice, to make a total of 117 examinations. The results of these 117 examinations are interesting: Internal medicine, 73 (65 percent) passes, 41 (35 percent) failures; cardiovascular, 1 pass and 1 failure; and tuberculosis, 1 pass.

It is impossible to assay the contribution of these examinations to the morale of the theater. The dependence of the Personnel Division upon such tangible data as certification by the several specialty boards in deriving the MOS (military occupational specialty) of medical officers gave this formula unusual weight in the minds of many individuals. To the cooperation of the American Board of Internal Medicine, especially the assistant secretary-treasurer, Dr. William A. Werrell, and to the guest examiners in the European theater, due credit is given for the successful discharge of this mission.

PROFESSIONAL MEETINGS

American Medical Society, ETOUSA

Medical society meetings constitute an important element in maintaining an alert profession in civilian life. Medical Department regulations insure a continuance of this activity in the Army hospitals. Where the spirit prevails, the meetings help maintain high standards. Such was the case in the European theater. In certain hospitals, X-ray and clinicopathologic conferences added to the superb tone of professional alertness. These routine hospital meetings were supplemented by the American Medical Society, ETOUSA. The seed for this theater activity was sowed in a meeting for the discussion of hepatitis at the General Medical Laboratory A, Salisbury, England, in which, 1st Lt. (later Maj.) William L. Hawley, MC, Maj. (later Col.) Paul Padgett, MC, and Colonel Gordon, of the U.S. Army; Dr. William H. Bradley, of the British Ministry of Health; and Dr. James K. McCollum of the Wellcome Laboratory participated.

The occasion of the first anniversary of the 5th General Hospital in the European theater led to a medical and surgical conference in which Colonel Badger discussed postinoculation hepatitis; Dr. John McMichael, traumatic shock; and Dr. Eric G. L. Bywaters, crush syndrome.

The first meeting of the American Medical Society, ETOUSA, was held on 23 June 1943, at the 298th General Hospital, Frenchay Park, Bristol, England. The commanding officer, Col. Oscar C. Kirksey, MC, and his staff were hosts. A committee on organization, composed of Colonels Kneeland and Hein, and Col. Robert M. Zollinger, MC, was named. This committee drafted a brief constitution which was adopted. The following officers were elected: President, Colonel Zollinger; vice president, Lt. Col. (later Col.) William F. MacFee, MC; secretary-treasurer, Maj. (later Lt. Col.) Clifford L. Graves, MC; councillors, Major Muckenfuss and Maj. (later Col.) Edward J. Tracy, MC. The second meeting of the society convened on 28 July 1943, at the 30th General Hospital. The commanding officer, Col. Charles B.

Kendall, MC, and his staff presented a very instructive program. On 18 August 1943, the third meeting of the society convened at the 2d General Hospital. Under the commanding officer, Col. Paul M. Crawford, MC, and his staff, a very profitable session was held. The last meeting of the American Medical Society, ETOUSA, was held on 26 April 1944, at the 127th General Hospital, Sandhills (near Taunton), England, with the commanding officer, Col. James L. Murchison, MC, and his staff as hosts. Colonel Middleton spoke on the care of the medical casualties from the far shore. Thereafter, the tactical situation and the number and dispersion of medical units made further meetings of the society impractical. This function, in turn, devolved upon the base sections and the hospital centers. Indeed, the Western Base Section had anticipated this eventuality and had arranged for a medical meeting to be held at the 52d General Hospital, Kidderminster, on 29 December 1943. This meeting was attended by 200 medical officers.

Inter-Allied Conferences

More far reaching in their influence were the Inter-Allied Conferences on War Medicine. In April 1942, Col. Victor Gallemacerts, Director, Belgian Army Medical Service, suggested to the British War Office the establishment of conferences on War Medicine. At that time, the difficulties in organization seemed insuperable, but the early and rapidly increasing numbers of medical representatives in the Armed Forces of the United States paved the way for a reconsideration of the subject. Colonel Cutler stimulated this movement through the offices of Mr. L. R. Broster, then surgical secretary of the Royal Society of Medicine. In the preliminary discussions, the Royal Society of Medicine offered its facilities as a meeting place and clerical assistance for the organization of the meetings. The meetings were designed "for the interchange and communication of medical experiences in the field and of the practical application of medicine to the needs of warfare, and for the exposition of the general principles of administration and organization of the medical services."⁶ The first of these meetings, attended by approximately 120 medical officers of the U.S. Army, was held at the Royal Society of Medicine on 7 December 1942. Maj. Gen. Sir Henry Tidy presided (fig. 93). The meetings were continued until 8 July 1945. A total of 24 conferences was attended by over 6,500 officers of the Allied medical services. These sessions served as a clearinghouse for the war experiences of the Allied forces. The topics covered the entire gamut of medicine and surgery as encountered under the war conditions of the period. Stirring stories of firsthand experiences at Dunkirk, Dieppe, Lake Chad, Arnhem, Bastogne, Buchenwald, and in the Arctic convoy held the interest of large audiences derived from all services. Two hundred and twenty speakers appeared before the conferences. Among these were the Chief Surgeon and a number of representatives of the Profes-

⁶ Inter Allied Conferences on War Medicine, 1942-1945, edited by H. L. Tidy and J. M. B. Kutschbach. London: Staples Press, 1947.



FIGURE 93. Maj. Gen. Sir Henry Letheby Tidy, President, Royal Society of Medicine (center) conferring informally with Colonel Kneeland (left) and Colonel Pillsbury.

sional Services Division. General Hawley, Colonel Kimbrough, Colonel Cutler, Colonel Kneeland, Lt. Col. (later Col.) Paul C. Morton, MC, and Colonel Middleton served on the organizing committee. To the success of this effort, none contributed more effectively than the secretary of the Royal Society of Medicine, Mr. Jeffrey R. Edwards, upon whom fell much of the detailed work of organization. One hundred and twenty of the papers presented at these meetings were bound and published in 1947 as *Inter-Allied Conferences on War Medicine, 1942-1945*, and constitute an essential element of the official medical history of World War II.

Allied Consultants Club

With the close rapport between the medical officers of the U.S. Army and their fellows in the Allied armed services came not only professional but also social interchange, cementing international relationships. Continued over the years of association with the British and Canadian consultants, particularly, came the natural design for the formation of the Allied Consultants Club. Broad though the term appeared, its membership was limited to the consultants in the English-speaking Allied armies. The first meeting of this group convened on 15 October 1944 at the 108th General Hospital (fig. 94) in Paris, with Colonel Kimbrough presiding (fig. 95). General discussions of battle trauma occupied the morning session. After luncheon, the consultants divided into two sections:



FIGURE 94. --Rear view of 108th General Hospital, Paris, France.

(1) Surgical conference under Colonel Cutler, and (2) medical conference under Colonel Middleton (fig. 96). The medical conference concerned itself with the following topics: Neuropsychiatric casualties in the Army, treatment of venereal diseases, special medical problems, and the proposed sulfonamide prophylaxis of infectious diseases. Participating in this conference were: General Biggam, Consulting Physician of the British Army; Brig. E. Bulmer, RAMC, Consulting Physician, British 21st Army Group; Brigadier Riddoch, Consulting Neurologist of the British Army; Col. J. S. K. Boyd, RAMC, Consulting Pathologist, British 21st Army Group; Colonel Pillsbury, Senior Consultant in Dermatology and Syphilology; Colonel Thompson, Senior Consultant in Psychiatry; Colonel Badger, Senior Consultant in Tuberculosis; Colonel Kneeland, Medical Consultant, United Kingdom Base, and Senior Consultant in Infectious Diseases; Colonel Hein, Senior Consultant in Cardiology, Lt. Col. Nathan Weil, Jr., MC, Consultant in Medicine, Third U.S. Army; Lt. Col. Guy H. Gowen, MC, Consultant in Medicine, Seventh U.S. Army; Lt. Col. John B. McKee, MC, Consultant in Medicine, Ninth U.S. Army; Colonel McEwen, Consultant in Medicine, Brittany Base Section; Colonel Muckenfuss, Director of Medical Research, and Commanding Officer, General Medical Laboratory A; and Maj. Alfred O. Ludwig, MC, Consultant in Neurology, Seventh U.S. Army.

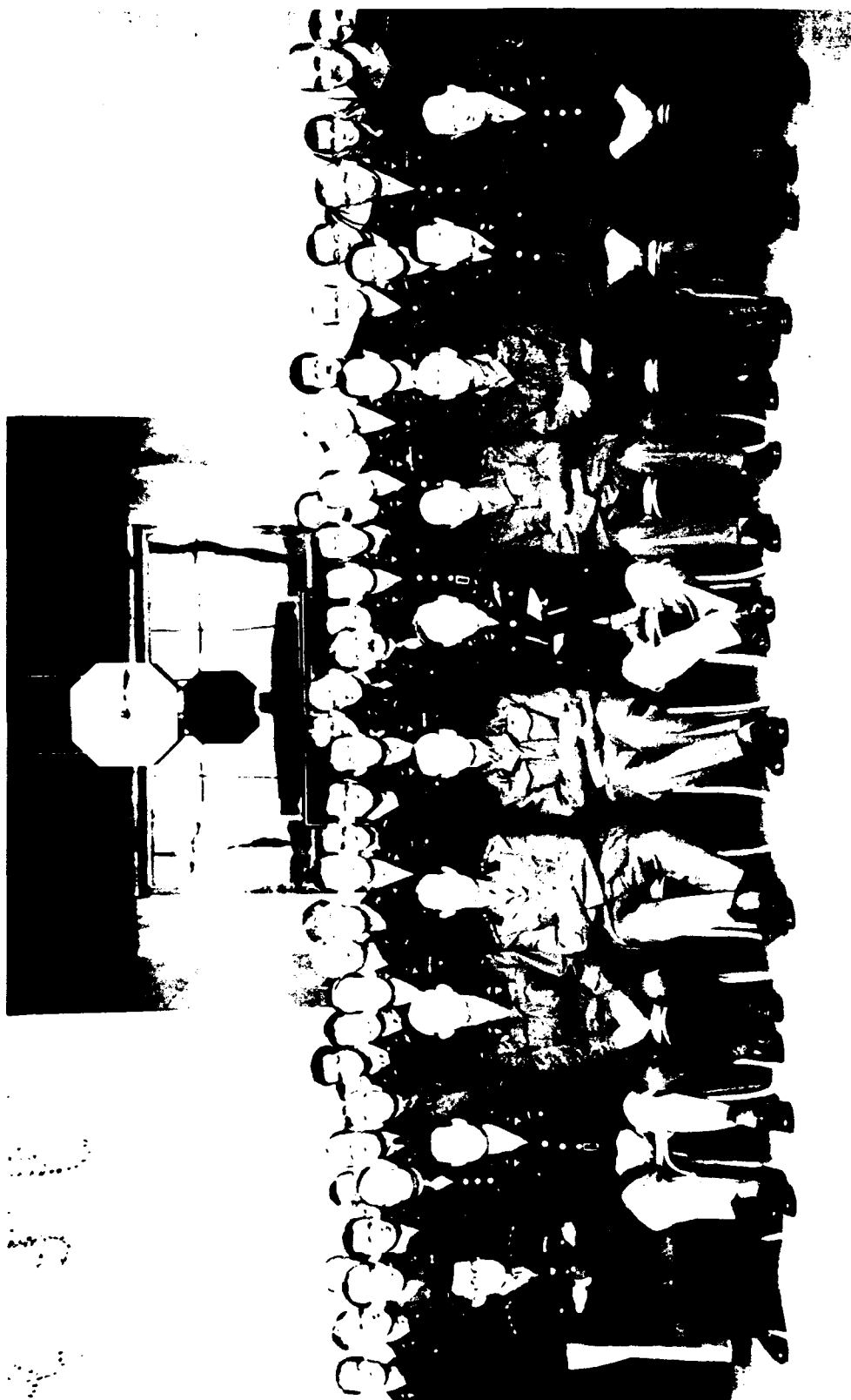


FIGURE 95. Participants at Inter-Allied Consultants Conference, 16th General Hospital, 15 October 1944.



FIGURE 96. Col. William S. Madenjian, MC, seated at table, presiding at medical conference held as part of Inter-Allyed Consultants Conference, 108th General Hospital, 15 October 1944. Col. Neil Cronin, MC (standing), is the speaker.

The session was continued on the morning of 16 October 1944, with a clinical program by the staff of 108th General Hospital, Lt. Col. (later Col.) Louis M. Rousselot, MC, presiding.

The next conference of the consultants club, which in all propriety should be termed "Anglo-American Consultants Club," was held in Brussels, 11 December 1944. Conspicuous among the papers presented before the medical section was Brigadier Riddoch's stirring appeal for sustained attention to the spastic paraplegic patients.

The third allied consultants conference (Anglo-American Consultants Club) was held in Paris, on 25 and 26 May 1945, at the 108th General Hospital. Among the topics of interest in the general session of the first day was shock. On the second day, the medical section discussed syphilis, hepatitis, malnutrition, tuberculosis, and typhus fever.

The registrants and participants in the discussion of the medical topics insured a most profitable session. They included: Brigadier Bulmer, RAMC, Consulting Physician, 21st Army Group; Brigadier MacKenzie, RAMC, Consultant in Dermatology; Brigadier Osmond, RAMC, Consultant in Venereology; Brig. J. H. Palmer, RCAMC, Consulting Physician; Brig. Robert C. Priest, RAMC, Consulting Physician, Western Command; Brigadier Whitby, RAMC, Director of Army Blood Transfusion Service; Colonel

Kneeland, Consultant in Medicine, United Kingdom Base, and Senior Consultant in Infectious Diseases; Colonel Pillsbury, Senior Consultant in Dermatology and Syphilology; Colonel Fitz, Consultant in Medicine, Delta Base Section; Colonel Gowen, Consultant in Medicine, Seventh U.S. Army; Colonel McKee, Consultant in Medicine, Ninth U.S. Army; Lt. Col. Carter Smith, MC, Consultant in Medicine, Fifteenth U.S. Army; Colonel Weil, Consultant in Medicine, Third U.S. Army; Surgeon Vice Admiral Sir Sheldon Dudley, RN, Director General of Medical Services; Surgeon Rear Admiral Gordon Gordon-Taylor, RN., Consulting Surgeon; Surgeon Rear Admiral Rowlands, Consulting Physician; Maj. Gen. Morrison C. Stayer, Chief Surgeon, MTO; General Tidy, President, Royal Society of Medicine; Brig. E. Boland, RAMC, Consulting Physician, British Army in Italy; Sir Claude Frankau, Deputy Director, EMS; Dean Charles Newman, British Postgraduate Medical School; Col. E. N. Alling, Commanding Officer, 814th Hospital Center; Colonel Gordon, Chief, Preventive Medicine Division; Lt. Col. (later Col.) Wendell H. Griffith, SnC, Chief, Nutrition Section, Preventive Medicine Division; Col. Esmond R. Long, MC, Consultant in Tuberculosis for The Surgeon General; Lt. Col. Hamilton Southworth, MC, Office of Scientific Research and Development; Colonel Cohen, Chief of Medical Service, 40th General Hospital; Lt. Col. Alva V. Daughton, MC, Chief of Medical Service, 48th General Hospital; Colonel Fahlstrom, Chief of Medical Service, 108th General Hospital; Colonel Fortune, Chief of Medical Service, 191st General Hospital; Lt. Col. (later Col.) Rudolph A. Kocher, MC, Chief of the Medical Service, 203d General Hospital; Lt. Col. Carl S. Lytle, MC, Chief of Medical Service, 62d General Hospital; Lt. Col. (later Col.) Herbert B. Pollack, MC, Chief of Medicine, 15th General Hospital; Lt. Col. Leonard G. Steuer, MC, Chief of the Medical Service, 198th General Hospital; Maj. Sarah H. Bowditch, MC, Assistant Military Attache, American Embassy, London; Maj. Marion Loiseaux, Consultant of the Women's Army Corps; Maj. Moses D. Deren, MC, Chief of the Medical Service, 194th General Hospital; Maj. (later Lt. Col.) Charles P. Emerson, Jr., MC, Chief of the Medical Service, 231st General Hospital; Maj. David Greeley, MC, American Typhus Commission; Maj. Richard Reeser, MC, Chief of the Medical Service, 202d General Hospital; and Capt. T. E. Caulfield, MC, Chief of the Medical Service, 230th General Hospital.

Upon the release of Buchenwald, Dachau, and other horror centers from German control, Colonel Pollack, of the 15th General Hospital, Liège, Belgium, and Capt. Leonard Horn, MC, of the 19th General Hospital, Rennes, France, had been ordered on detached duty for service with Colonel Griffith to study and collaborate in the control of malnutrition among the released military and civilian prisoners. Colonel Pollack's analytic discussion of the subject was a highlight of this conference. The opportune presence in the theater of Colonel Long had added greatly to Colonel Badger's master plan for the management of the recovered Allied military personnel coming into U.S. fixed hospitals upon release. Some idea of the magnitude of the problem may be gained from the fact that of 1,700 of these patients received at the 46th General Hospital,



FIGURE 97. One of recovered Allied personnel cared for at 40th General Hospital showing debility and malnutrition characteristic of many.

975 had tuberculosis (fig. 97). Of this group, 650 were in a moderate to far-advanced stage of the disease. A system of aseptic technique was combined with clean areas for the protection of the nursing and medical personnel. Although only three meetings of the Anglo-American Consultants Club were held, its very existence should be recorded as a measure of the spirit of mutual good will and confidence engendered among the English-speaking consultants through the years of their effort in a common cause. Truly, this organization serves as an object lesson in international amenities.

SUPPLY AND USE OF DRUGS

The consultants of the Professional Services Division in General Hawley's office were regularly consulted by the Finance and Supply Division about problems of mutual interest. On 31 August 1942, Colonel Middleton conferred with Lt. Col. George Perkins, MC, in charge of supplies for the U.S. Army Medical Department, and with Major Gallagher, RAMC, at 39 Hyde Park Gate, London, in a survey of the availability of British drugs and chemicals for use in the U.S. Army. By all standards—atomic weight, melting point, freezing point, solubility, measures of purity, and other criteria—drugs of

British origin were checked against the U.S. pharmacopoeial standards. Where complete concurrence existed, no change was recommended, and the assigned number in the Standard Supply Table of the Medical Department could be used interchangeably. Where differences in strength were found in articles of uncommon usage, a change in the label was recommended. In only one important area did the U.S. consultants differ with their British confreres; namely, the necessity for broadening the base of sulfonamides. The British were limited by available manufacture and supply to sulfapyridine. The American officers insisted upon the inclusion of sulfadiazine at least. On 11 September 1942, Colonel Perkins and Colonel Middleton recommended a reconciliation of the nomenclature by a listing of 14 preparations of different strengths according to their values in the British Pharmacopoeia. Apparently, these carefully considered recommendations were not completely implemented, but, on 9 February 1944, at the request of the Finance and Supply Division, Colonel Middleton reported to Depot G-30 in London to review certain available drugs from British sources with Lieutenant Smith, SnC. The drugs without a useful prospect were rejected. On 5 October 1942, Colonel Middleton reviewed the first aid kit of an M-4 tank in the 372d Tank Battalion with Captain Moore, near Tidworth. The position of the first aid kit behind the left shoulder of the driver on the lateral wall of the forward compartment of the tank made it inaccessible to anyone except the driver. Furthermore, the kit contained no sulfonamide or morphine, and the burn therapy was limited to tannoid. A correction of these deficiencies was recommended to the Supply Division.

The necessity for the conservation of quinine led to the preparation of Circular Letter No. 55, dated 23 October 1942, Office of the Chief Surgeon, Headquarters, ETOUSA. This circular letter recommended use of salicylates and coal-tar derivatives rather than the empirical use of quinine. The directive also stated that quinine would not be used for the treatment of conditions other than malaria. Furthermore, it stated: "Since all malarial patients will be evacuated to hospital units, *no quinine will be issued to divisional medical installations.* Atabrine will be used for the suppressive therapy of malaria."

On 2 October 1942, the faculty of Oxford University gave a reception for the staff of the 2d General Hospital. Colonel Middleton represented General Hawley at this function. On this occasion, Prof. Howard W. Florey extended to Colonel Middleton an invitation to visit the William Dunn Laboratory of Pathology. With General Hawley's approval, Colonel Middleton arranged an appointment with Professor Florey for 24 October 1942. At this time, Professor Florey acceded to a plan to supervise penicillin treatment and to train teams for each of the U.S. general hospitals. The plan was to be carried out at the 2d General Hospital. The teams to be trained were to include a clinician and a bacteriologist, and a week was decided as adequate time for the necessary instruction. Lt. Col. (later Col.) Rudolph N. Schullinger, MC, Chief, Surgical Service, 2d General Hospital, had attended the reception and had anticipated the official visit by making personal observations of the clinical application of

penicillin in several institutions in the environs of Oxford. (On 18 May 1944, he submitted a report, entitled "Penicillin in the Treatment of Surgical Infections," based on these early observations.) When the 2d General Hospital was agreed upon as the training center, Colonel Schullinger was named as the logical medical officer of the unit to serve as the Chief Surgeon's representative with Professor Florey. The plan was submitted to General Hawley, who approved. Complete acquiescence to the plan came from Professor Florey by return mail. He suggested that he would use his influence to have Prof. A. N. Richards send the American penicillin to Oxford.

Medicine came naturally to its own in the application of penicillin to the treatment of infectious diseases. In one area of its application, the European theater broke new trails. Penicillin was recommended in the treatment of diphtheria carriers and of severe clinical diphtheria as an adjuvant to, not a substitute for, diphtheria antitoxin.⁷ Some measure of success attended this procedure.

The table of basic allowance is the bible of the supply officers. Its periodic review and correction is required under conditions of active warfare in a foreign theater. In ETOUSA, this lot fell to the Professional Services Division in General Hawley's office. It was not an easy one, when viewed in the light of the accretion of the years and the traditional foibles of therapeutics. Interestingly, one of the most questionable of all therapeutic agents and one whose accounting gives commanding officers of Army hospitals the greatest concern, namely, spiritus frumenti, proved to have the strongest defenders at the highest levels. The tables for basic allowance—class I items—for the North African campaign were completed in some measure by the Professional Services Division. In this instance, arbitrary figures for the incidence of tropical diseases were applied to the requirement of special or specific drugs. This problem did not prove as pressing in the planning for OVERLORD, since tropical diseases are not a problem in northern Europe. However, certain secret advices indicated an unusual incidence of serious diphtheria in northern France and the Low Countries. Accordingly, a disproportionately large supply of diphtheria antitoxin was stocked for the invasion.

HOSPITAL FACILITIES

The Chief Surgeon, ETOUSA, encouraged a close liaison between the Professional Services and the Hospitalization Divisions of his office. In an early survey, 4 to 6 August 1942, Colonel Middleton was requested to report to the Hospitalization Division his observations of the hospital situation in the North Ireland Base Section. This area was unusual in its primary utilization as a training center for ground troops. With the complete cooperation of the base surgeon, Colonel Green, the hospital facilities at Musgrave Park, Waringfield, Irvinetown, and Londonderry were surveyed from a physical as

⁷ Administrative Memorandum No. 151, Office of the Chief Surgeon, Headquarters, ETOUSA, 27 Nov. 1944, subject: Tentative Program for the Observation of the Efficacy of Penicillin in the Treatment of Diphtheria.

well as a professional standpoint. In this relation, one detail is worthy of record. At Londonderry, the 10th Station Hospital was established in one old barracks-type building and a series of detached structures in which there was a serious fire hazard. Furthermore, Londonderry was at the end of a narrow gage railroad, and evacuation by rail depended upon a shuttle pattern. Evacuation by sea required shallow draft craft. Directly across the street from the 10th Station Hospital was a superbly constructed and equipped naval hospital. Colonel Middleton recommended the abandonment of the Army installation by the consolidation with the naval unit, as an economical and sound solution to the problem. This consolidation was particularly feasible by reason of the relatively light patient load of both hospitals. General Hawley indicated his willingness to accept the validity of the recommendation but stated that, under existing conditions, such a pooling of medical interests in the Londonderry area was impractical.

With the invaluable assistance of Lt. Col. John Douglas, RAMC (fig. 98), the Hospitalization Division, under Col. Eli E. Brown, MC, secured



FIGURE 98.—Lt. Col. John Douglas, RAMC.

90,000 beds in British installations before August 1943. The British facilities ranged from temporary conversion camps to permanent construction and from the Royal Victoria (Netley) Hospital at Southampton Water to a series of pavilion hospitals newly constructed under the Emergency Medical Service for the postwar implementation of the white paper (later the National Health Act) (fig. 99). Under a mandate of General Hawley, the consultants reported upon the physical details of strength and deficiency in these hospitals. The absence of shower baths and the limitation of toilet facilities were among the commonest complaints. In many of the newer hospitals and in all of the temporary units housed in Nissen huts, the source of heat was two stoves placed at either end of the center of the ward. These stoves were stoked by lifting a lid from the top and pouring in bituminous coal from a scuttle (fig. 100). The resultant smudge was inevitable, but this source of heating obtained in the United Kingdom for the duration. The open corridors without provision

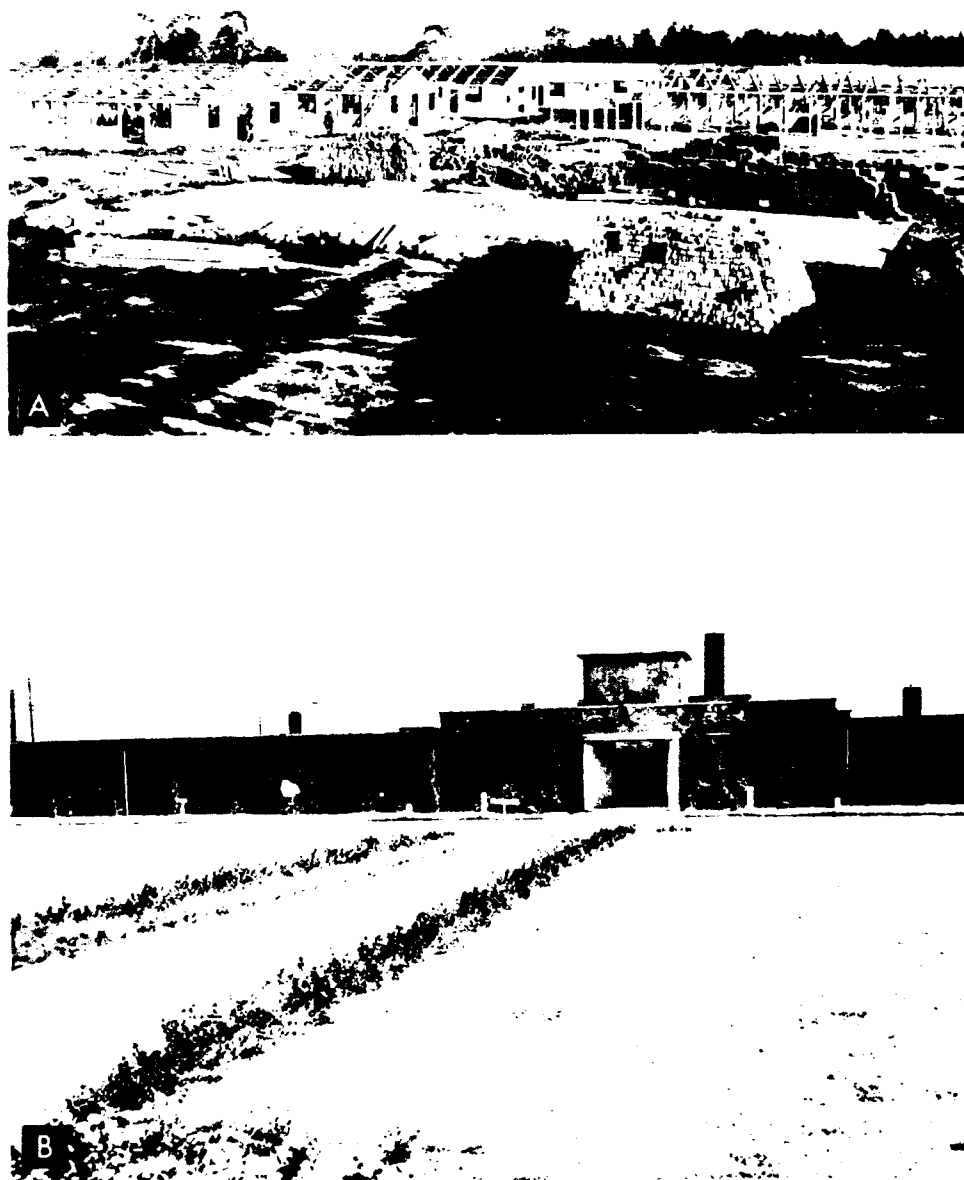


FIGURE 99. Typical examples of hospital construction in United Kingdom for U.S. Army. A. New construction underway at East Moors, Rigwood, Hants., England, 13 January 1943. B. Typical hospital headquarters building of permanent brick construction erected for U.S. Army.



FIGURE 99. Continued. C and D. Temporary buildings converted for use as U.S. Army hospitals.

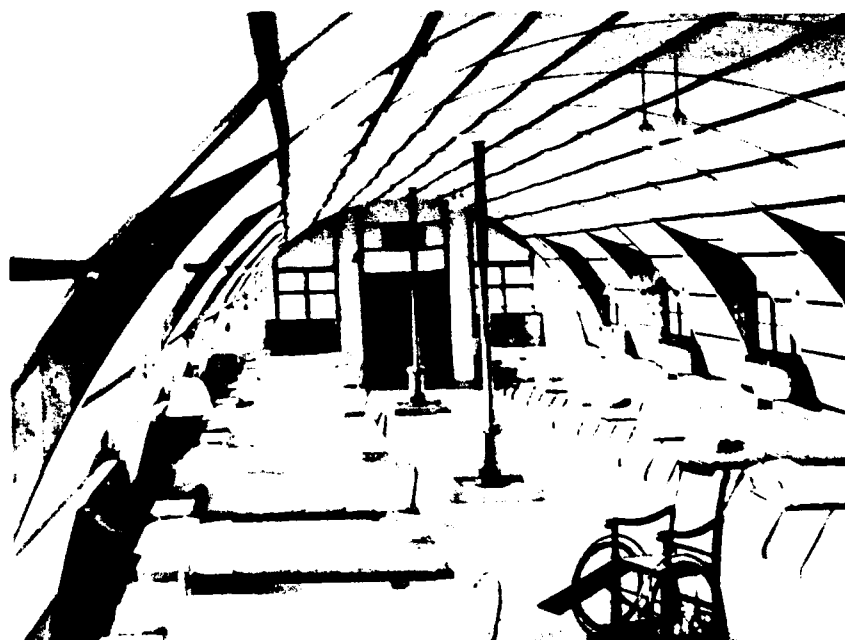


FIGURE 100 Provision of heat in Nissen-hut wards by two coal stoves.

for wind or storm break were eventually closed in some areas (fig. 101). The Professional Services Division cooperated with the Hospitalization Division in improvising isolation facilities which, under the British plans, were inadequate in a majority of instances. In the adaptation of existing buildings to hospital purposes, fire hazards were occasionally overlooked, as at the 5th General Hospital and the 10th Station Hospital, Musgrave Park, Ireland, and at the 38th Station Hospital, Winchester, England (fig. 102). In these instances, the consultants recommended appropriate protective devices. The elements occasionally confirmed the advice. On 20 October 1943, with Colonel Kimbrough and Colonel Zollinger, Colonel Middleton visited the 12th Evacuation Hospital at Carmarthen, Wales, to find it located in a pocketed valley. A recent rain had made a quagmire of the tent area, and the enlisted personnel and officers in mess line were knee-deep in mud and water. Needless to say, those responsible for selection at this site erred seriously in planning.

A real challenge arose in the establishment of fixed hospitals in tented units in the field. On 22 February 1944, in a survey of the 280th Station Hospital at Shortgrove Park, commanded by Col. Howard W. K. Zellhoefer, MC, an unusually efficient expedient was observed. To combat mud and confusion, all roads and paths were laid out before any construction was begun. No one was permitted to walk on the grass or earth. The concrete foundations were laid and tents pitched as soon as the concrete dried (fig. 103). Interestingly, a similar plan employed at the 298th General Hospital, near Liège, Belgium, under Col. Walter G. Maddock, MC, commanding officer, made this installation the model of field perfection on the Continent.



FIGURE 101. Long, open corridors at hospital of temporary Nissenhut construction.

EVACUATION POLICIES

General Hawley charged his Professional Services Division with the responsibility of advising in the formulation of evacuation policy for the theater. On 10 December 1944, evidently concerned by an apparent lag in the evacuation of patients from fixed hospitals, General Hawley issued the following instructions to his chief consultant in medicine in a letter, subject: Survey of Clearance of Hospital Beds.

1. You are to observe particularly the following:

- a. Are patients held in hospital to assist in the work of the hospital?
- b. Are patients held in hospital purely for subjective complaints that are not confirmed by objective findings?
- c. Are patients for the Z I being ordered and reported promptly? In the great majority of instances, the decision as to the ultimate disposition of a patient entered should be made within 48 hours of his admission.
- d. Are directives of this office being followed as to the limitations upon definitive treatment that will be done in this Theater?
- e. I desire that you make periodic reports to me in person with information covering the beds and hospitals and proportion of cases found that could have been cleared earlier.

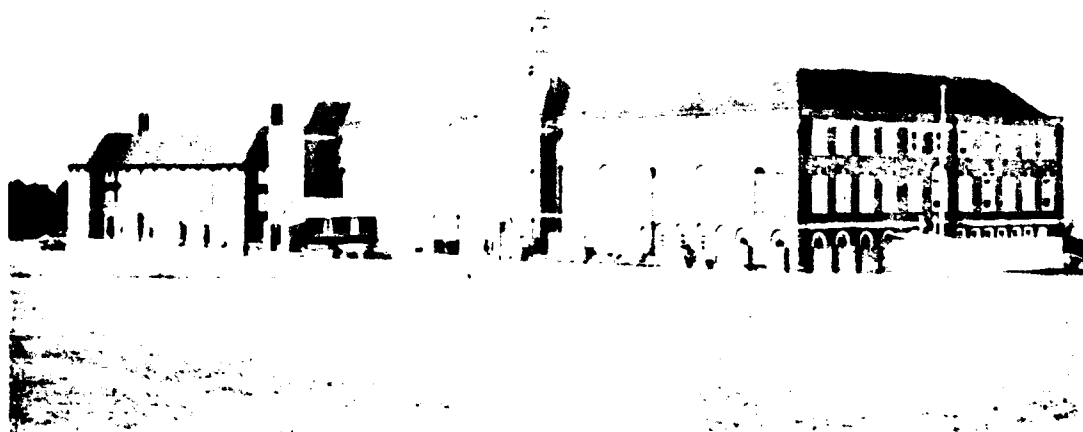


FIGURE 102. 38th Station Hospital, Winchester, England, formerly the St. Swithin's School.

If this order be related to the tactical situation, its explanation becomes obvious. A similar communication to the Professional Services Division from the Chief Surgeon, ETOUSA, dated 21 January 1945, carried the same implication. It read:

1. We are getting constant complaints which even though each involves only small numbers in the aggregate show that there is still need for much training of medical officers both in sorting of cases, and in disposition of such cases as are returnable to duty. I realize that there has been considerable improvement in this situation in the past six months, but there is still room for improvement.

2. I desire, therefore, that without delay, you have a thorough survey made of every Reinforcement Depot on the Continent by competent observers. This survey:

a. Will be sufficiently comprehensive to give a true picture of conditions. Without imposing any rules, I feel that each observer should remain at a depot for several days, evaluating the fitness for duty of every man returned from hospital during this period.

b. Will present facts, not generalities.

c. Will evaluate the professional competence of medical officers and the system of reexamination at Reinforcement Depots.

d. Will at the same time educate and train medical officers on duty at Reinforcement Depots.

3. Necessary coordination will be made with GFRS.

4. Action indicated by result of survey will be presented to me in form of plan and directive.

5. Please expedite.

With Maj. (later Col.) John N. Robinson, MC, Senior Consultant in Urology, ETOUSA, Colonel Middleton visited the 11th Reinforcement Depot at Givet, France, and the 16th Reinforcement Depot at Compiègne, France, on 26 January 1945, and the 9th Reinforcement Depot at Fontainebleau, France, on 29 January 1945. After a careful survey and spot check upon the



FIGURE 103. — Establishment of an ideal tented hospital facility. A. All roads, paths, and flooring planned. Concrete is poured before a tent is pitched. B. Completed hospital.

situation in these units, these officers reported a remarkably good disposition record to General Hawley. Indeed, the quoted figure of 0.5 percent improper disposition proved excessive.

The problem of disposition to the Zone of Interior for medical reasons had interested the medical consultants from the beginning of operations. The year's experience to 1 June 1943 was deemed a reasonable basis for judgment. In this period, 3,248 transfers for physical causes had been made from the European theater to the Zone of Interior. Of this group, medical reasons accounted for 1,015 transfers (31.2 percent). The important diagnoses involved were hepatitis, peptic ulcer, chronic arthritis, and bronchial asthma. Hepatitis accounted for 352 (34.6 percent); peptic ulcer (20.1 percent) was next in order of frequency. Chronic arthritis (10.9 percent) and bronchial asthma (9.5 percent) were appreciable factors in the attrition of manpower. Pulmonary tuberculosis (3.6 percent), bronchitis (2.4 percent), and rheumatic heart disease (2.2 percent), although lesser contributors to the loss of manpower, reflected the improved screening before induction and represented the occasion for continued vigilance. Arterial hypertension (1.9 percent) and bronchiectasis (1.2 percent) were the only remaining conditions accounting for more than 1 percent of the disabilities. An analysis of the records, with particular reference to the occurrence of symptoms prior to induction, led to the recommendation that chronic or recurring conditions, such as peptic ulcer, chronic arthritis, and bronchial asthma, preclude oversea assignment to an active theater of operations.

CLINICAL STUDIES

Peptic ulcers.—In this relation, the further experience with peptic ulcer in the European theater should be a matter of record. At the urgent behest of Lt. Col. (later Col.) John M. Sheldon, MC, Chief, Medical Service, 298th General Hospital, a pilot plan for the management of peptic ulcers was instituted in that unit. This plan proposed the salvage of a group of soldiers with peptic ulcer by their assignment to limited duty under careful control and restrictions within the hospital unit. The difficulties inherent in such a clinical experiment became evident early, and the trial failed despite the cooperation of the commanding officer and the sincere efforts of the medical staff. The similar experiences of several less well-controlled attempts to retrieve patients with peptic ulcer for active service in the theater confirmed the conviction *that no soldier with a history of this condition should be assigned to an oversea theater of operations.* The average contribution of soldiers with this condition to the war effort was 3 months of more or less interrupted service. With transportation at a premium and hospitalization doubly expensive in personnel and materiel in oversea theaters, further trials of the utilization of these patients in the Armed Forces on limited duty should be restricted to the Zone of Interior.

Hepatitis. This was the first disease encountered in epidemic proportions in the European theater. Its early incidence was explained by its homologous

serum source in the yellow-fever vaccine, but its persistence depended upon the naturally occurring virus. A survey of its epidemiology and clinical course are beyond the purview of this section. The interest from a historical standpoint lies in two directions. On 7 August 1942, Colonel Middleton proposed to Colonel Hawley a plan to label the record of all patients with hepatitis, with a thought to their later study. Furthermore, it was proposed that the identification tag of all soldiers suffering from hepatitis be given a distinctive mark and that instructions be promulgated to insure the section of the liver of such soldiers at subsequent laparotomy or necropsy. Such materials were to be forwarded to the Army Medical Museum to insure a careful registry and contribute to expanding knowledge of the evolution of the pathologic changes of this condition. The Surgeon General rejected this suggestion, and a personal letter, dated 27 January 1943, from Col. James E. Ash, MC, Curator, Army Medical Museum, maintained that complete histologic restoration of hepatitis might be expected. Although this position proved to be true in the overwhelming majority of instances in which microscopic studies of the liver were afforded subsequent to attacks of viral hepatitis, Lt. Col. D. Murray Angevine, MC, in General Medical Laboratory A, collected several instances of the progression of viral hepatitis to portal cirrhosis (Laennec's).

In conference on 26 February 1943 with Col. John Beattie, Director, Bernhard Baron Research Laboratories, Royal College of Surgeons of England, at Finchfield, arrangements were made to afford clinical facilities in an Army hospital for the study of the influence of sulfhydryls (sulfur-containing amino acids) on the course of hepatitis. By analogy with the action of these amino acids in protecting the liver against toxic agents, Colonel Beattie predicted distinct advantages in the management of hepatitis. On 27 February 1943, Colonel Griffith of the Preventive Medicine Division of General Hawley's office supported this position on the basis of his personal experimentation, which indicated that methionine and cystine protected the liver against cobalt and nickel poisoning. General Hawley designated the 12th Evacuation Hospital at Braintree, England, as the proper location for this study. Upon conferring with Lt. Col. (later Col.) Marshall S. Brown, MC, Capt. Austin P. Boleman, Jr., MC, was designated as the medical officer of this hospital to head the unit.

On 6 July 1943, after the transfer of the 12th Evacuation Hospital from this location, Colonel Middleton discussed the problem with Colonel Beattie and with the staff of the 121st Station Hospital. Miss Smith, of the 5th General Hospital, was transferred to this unit for laboratory duties, and Colonel Hatcher, commanding officer, and Colonel Teitelbaum, Chief, Medical Service, afforded the supporting leadership. Maj. Charles Steele, MC, and Lieut. David L. Fingerman, MC, were in clinical control, and Captain Johnstone, in the laboratory.

In a conference on jaundice at the Royal College of Surgeons on 23 November 1943, Colonel Beattie postulated the probable existence of two etiologic factors; namely, X in arsphenamine hepatitis, and Y in the naturally occurring

hepatitis. This is probably the first public reference to such a distinction. The clinical experiment on the value of the sulfur-containing amino acids in the treatment of hepatitis was extended to carbon tetrachloride poisoning and infectious mononucleosis. Certain brilliant results attended the intravenous use of methionine in carbon tetrachloride poisoning. The results in the management of infectious mononucleosis and infectious hepatitis may be translated in the simple terms of improved nutrition. In this relation, there appeared no advantage over the high-protein diet in use in the theater. However, the relapse rate among patients receiving sulfhydryls was appreciably lower than the prevailing rule.

Motion sickness.-- In all amphibious and airborne operations, particularly those involving small seacraft and gliders, motion sickness must be given serious consideration. Although the professional responsibility for this study resided in the Medical Consultants Division of General Hawley's office, the Division's role primarily was advisory. On 10 November 1943, Colonel Montgomery, Medical Consultant to the Canadian Army, and the Chief Consultant in Medicine, ETOUSA, conferred with a Canadian surgeon, Lt. William S. Fields, RCNVR, who had been engaged in research in motion sickness at the Neurological Institute, Montreal. In the judgment of this group, 30 percent of individuals had a psychic basis for this experience. The Canadian seasick remedy consisted of hyosein hydrobromide, 0.6 mg.; hyoseyamine, 0.3 mg.; and nicotinic acid, 100 mg. The Canadian results indicated 50 percent protection from this agent. Capt. James C. Williams, MC, had been assigned by the Army Ground Forces for studies of motion-sickness preventive, U.S. Army development type, under simulated invasion conditions. His results were limited and inconclusive. In studies of troops airborne in gliders (fig. 104), Lt. Col. (later Col.) David Gold, MC, with the cooperation of a regimental surgeon, 40th Infantry, concluded that there was some protection in the motion-sickness preventive (Sodium Amytal (amobarbital sodium) 60 mg., scopolamine hydrobromide 0.2 mg., atropine sulfate 0.15 mg.). On 17 November 1944, in a status report to General Hawley on the motion-sickness preventive, U.S. Army development type, Colonel Middleton reported on two groups of soldiers returned from the Continent to fixed hospitals in the United Kingdom after D-day. Of the soldiers analyzed, 613 had taken motion-sickness preventive, and, as control, 306 soldiers had taken no preventive. A statistical analysis of the results by Lt. Col. John H. Watkins, SnC, of the Medical Records Division in General Hawley's office indicated no significant difference in the two groups. The adverse effects, namely, blurring of vision and unusual sleepiness, obtained in only 38 soldiers (0.6 percent). From the available evidence, the following deductions were drawn:

A. The grounds for the adoption of Motion Sickness Preventive, U.S. Army Development Type, were not sound from pharmacologic and clinical standpoints. Combined potent drugs need not show an additive effect in their composite action.

B. The wide range of dosage and interval of administration militate against an accurate statistical analysis of the results of this particular operation; but from the available evidence,



FIGURE 101. Troops of First Allied Airborne Army in glider during Arnhem operation.

it may be stated that the agent showed no material advantage over a large controlled group. Admittedly, the latter individuals represent a group resistant rather than susceptible to motion sickness.

C. An interesting by-effect of Motion Sickness Preventive, U.S. Army Development Type, among a limited number of airborne troops was a singular sense of relaxation. Certain of the glider troops mentioned this effect in striking contrast to their usual feeling of tension. The mild hypnotic effect of amytal and scopolamine in all probability accounts for this desirable reaction.

More caution in the delegating of medical functions such as the administration of potent drugs by untrained lay personnel was cited.

PHYSICAL STANDARDS

The establishment of physical standards was a responsibility of the Professional Services Division in General Hawley's office; hence, great interest was attached to the British and Canadian experience in this area. In a conference on 28 June 1942 with Air Commodore Conybeare and Air Commodore Rook, medical consultants to the Royal Air Force, Colonel Middleton was astonished to learn of the policy of the early rehabilitation of pilots with pulmonary tuberculosis. So pressing were the British demands for manpower that pilots under artificial pneumothorax therapy for limited pulmonary tuberculosis were being utilized as trainers. Apart from this drastic departure from the very conservative position of the U.S. Army, many other instances of

compromises in the interest of the more complete utilization of British and Canadian manpower were encountered.

On 7 July 1943, at the monthly meeting of the Medical Subcommittee of the Royal Army Medical Consultants Committee, Brig. Frank D. Howitt, RAMC, consultant in physical medicine, reported on his study of the PULHEMS system, a plan of physical categorization which had been devised by the Canadians and which afforded a profile of the examined soldier by systems so that a composite picture of an individual could be gathered at a glance. Subsequent discussions of this subject, particularly with Colonel Montgomery of the Canadian Army, left no doubt as to its general applicability. The careful studies of Lt. Col. (later Col.) George G. Durst, MC, led to its adoption by the U.S. Army as the PULHES (Physical capacity or stamina, Upper extremities, Lower extremities, Hearing, Eyes, Neuropsychiatric status) physical profile serial. With the pressure of redeployment, Maj. Charles D. May was called to Headquarters for the interpretation of this system.

REDEPLOYMENT

The program of redeployment placed an overwhelming burden upon the Personnel Division in General Hawley's office, which required the continuous support and advice from the Professional Services Division. Within their respective divisions, the consultants were required to act upon the qualifications of all medical officers in the theater. The point system together with the MOS designation became determining factors in decisions as to the ultimate disposition of the medical officers. Fortunately, the mutual interests of the service and the concerned medical officer could, in a majority of instances, be protected by the consultants' personal knowledge of the officer's qualifications. Notwithstanding this modifying circumstance, the exigencies of the situation were such as to resolve much of the actual redeployment to the cold figures of supply and demand.

On 10 February 1945, Colonel Kimbrough returned to the Zone of Interior (fig. 105). Colonel Cutler was named as the new director of Professional Services Division in the Chief Surgeon's Office, and Colonel Pisani became Colonel Cutler's executive officer. The Medical Consultation Service, ETOUSA, had remained remarkably stable throughout the period of activity of the theater. Among the senior consultants, only Colonel Hein had been lost by reason of a physical disability. His position of senior consultant in cardiology was not refilled. The total picture of the Medical Consultation Service as of 30 June 1945 may be resolved by reference to the listing of consultants shown in appendix A, p. 829. In the interest of a comprehensive picture of the operation, the names of all medical consultants are included, as their inclusion gives some idea of the fluidity of the tactical situation and, by the same token, of the changing requirement for consultation service.

With a slight lag after V-E Day, 8 May 1945, the medical situation in the European theater underwent rapid changes upon troop movement and redeployment. The Medical Consultation Service experienced even more rapid altera-



FIGURE 105. Col. James C. Kneeland's farewell party on the eve of his departure. Left to right, Colonel Middleton, Colonel Kneeland, General Hawley, and Colonel Collins. Paris, France, February 1945.

tions. Late in June 1945, Colonel Kneeland was recalled to the Zone of Interior. No successor for him was named in the capacity of senior consultant in infectious diseases. The onerous duties that he had ably discharged as consultant in medicine to the United Kingdom Base were taken over by Lt. Col. (later Col.) Laurence B. Ellis, M.C.

As of 30 June 1945, the Medical Consultation Service, ETOUSA, had the composition listed in appendix A—p. 829—with the exception of a senior consultant in cardiology; a senior consultant in infectious diseases; a base section consultant to the Brittany Base Section, which, as has been pointed out, was dissolved early in the war; and hospital center consultants to the 15th, 801st, 802d, 803d, 804th, 811th, and 819th Hospital Centers. The fact that no consultants were serving in these capacities as of 30 June 1945 reflects the tactical situation, end of hostilities in Europe, at the time. The field army consultants who served armies active in the theater remained unchanged.

In the first week of July 1945, Colonels Pillsbury and Thompson were ordered to the United States. Both of these consultants had done superb jobs of organization and leadership in their respective fields of dermatology and neuropsychiatry and left enviable records of accomplishment in the interest of welfare of the U.S. soldier. With the rapidly evolving medical situation and particularly with the urgent demand for continuing advice to the Personnel Division in the redeployment program, Colonel Middleton requested the assignment of Colonel McEwen to the Professional Services Division as Senior

Consultant in Medicine. On 27 July 1945, Colonel Middleton was ordered to Washington by The Surgeon General to attend the Pacific conference, whereupon his duties devolved upon Colonel McEwen.

SUMMARY

In reviewing the record of the Medical Consultants Section, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, certain significant details come into sharper focus. The organizational pattern was based upon the organizational setup used in World War I, supplemented by sound advice from the medical consultants of the British and Canadian Armies. For the duration of active military operations, the rapport with the British and Canadian medical consultants was intimate and profitable. Through the limitations imposed by The Surgeon General, medical officers in the theater were employed in a consulting capacity, utilizing their specialized skills, rather than drawing further upon the depleted professional resources in the United States. In accordance with the principle of the most complete utilization of talent wherever possible, consultants were used in a dual capacity. Their primary responsibility remained in their assignments as chiefs of the medical services of fixed hospitals, and at the same time their special talents were used in consultative relationships to the theater. With the growth of the theater, these keymen were assigned larger responsibilities in hospital centers and base sections while continuing to function as senior consultants in their respective subspecialties of medicine for the theater, a plan which paid heavy dividends in its cohesiveness. Only two of the senior consultants whose administrative duties were deemed full time, namely, Colonels Pillsbury and Thompson, were stationed at headquarters.

Before D-day, the pattern of organization had undergone a fair trial under relatively quiet conditions in the United Kingdom, where by this time almost 140,000 beds had been prepared. The Chief Surgeon, ETOUSA, was committed to the thesis that the only reason for the existence of the Medical Department in the Army is the prevention and care of the sick and injured. His complete confidence in the mission of his Professional Services Division insured the highest possible level of coordination among the several divisions of his office. From an operational standpoint, unquestionably the ability to control the distribution of trained professional personnel to the greatest advantage of the sick and wounded was the most important dividend from this farsighted policy. With the support of the Chief Surgeon, invaluable channels of direct communication for the dissemination of professional information were encouraged, to the distinct improvement of medical service. Lastly, but certainly not least in the final analysis, the medical consultants in the Professional Services Division, to whom had been assigned the task of delivering the best possible medical care to the soldiers of the U.S. Army in the European theater, were afforded every reasonable support to attain this objective. Within the personal capabilities and limitations of the individuals concerned, the measure of their success in fulfilling this mandate must rest on the record.

Part II. Senior Consultant in Dermatology and Syphilology⁸

EVALUATION OF THE SITUATION

Colonel Pillsbury (fig. 106) arrived in the United Kingdom during December 1942 and was assigned as one of two full-time consultants in the Medical Consultation Service, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA. Colonel Pillsbury filled the position of Senior Consultant in Dermatology and Syphilology, ETOUSA; the other full-time position was that of the Senior Consultant in Neuropsychiatry, ETOUSA.



Figure 106. -Col. Donald M. Pillsbury, MC, Senior Consultant in Dermatology, Office of the Chief Surgeon, ETOUSA.

Making immediate contact with his counterparts in the forces of the British Commonwealth of Nations, Colonel Pillsbury found a valuable source of information in Lt. Col. (later Brigadier) R. M. B. MacKenna, Consultant in Dermatology for the Royal Army Medical Corps. Colonel MacKenna was able to recount the skin diseases most frequently found in England, the measures undertaken by the British Army to prevent and control them, and the availability of dermatologic supplies in the United Kingdom. Lt. Col. Milton H. Brown of the Royal Canadian Army Medical Corps was particularly helpful because of the experiments the Canadian Army was conducting in massive arsenotherapy of early syphilis, a subject of great immediacy in view of the marked military advantage some shortened method of treatment would have. Contact with the British Emergency Medical Service was maintained in

⁸ The narrative for part II was compiled by Maj. James K. Arima, MSC, The Historical Unit, U.S. Army Medical Service, in collaboration with Donald M. Pillsbury, M.D., former Senior Consultant in Dermatology and Syphilology, ETOUSA. Dr. Pillsbury contributed the summary in retrospect in May 1956.

connection with treatment of such U.S. personnel as were admitted to Emergency Medical Service hospitals.

Dermatology

On his arrival in England, Colonel Pillsbury found scabies, superficial pyogenic infections of the skin, contact dermatitis, and chronic eczematous eruptions increasing in incidence. Pediculosis and various types of ringworm infections also appeared to be a problem. Inspections of hospitals and dispensaries showed that earlier diagnosis with appropriate treatment in field units and hospitals was needed in many cases to prevent disability. In the chronic dermatoses, such as atopic dermatitis and severe psoriasis, early classification and determination of prognosis would identify patients who, with no reasonable prospect of early permanent improvement, should be returned promptly to the Zone of Interior in order to prevent their becoming a heavy load on medical and nursing personnel. Many soldiers who had marked sensitivity to such items as wool, dye, and leather were incapable of full duty. Many had had these disabilities prior to induction and should not have been sent to the theater.

The providing of dermatologic supplies in adequate amounts and the development of new drugs and emulsions were concomitant problems. For example, benzyl benzoate treatment of scabies was thought to be suitable for use in field units, but there were problems as to supply, preparation, and the best vehicle. A standard emulsion ointment as a vehicle for sulfonamides and other medicinal agents in the treatment of superficial pyogenic skin infections was also needed (p. 285 and p. 312).

Syphilology

The field of syphilology was rife with problems of immediate concern. A schedule of treatment for venereal diseases was prescribed in a directive from The Surgeon General.⁹ This schedule, however, was not being followed in all units because of difficulty in obtaining Mapharsen (oxophenarsine hydrochloride). In some instances, there had even been a complete failure in the distribution of this drug. Consequently, American Mapharsen, British Mapharside, and neoarsphenamine were all being used. Because of the conflicting evidence regarding the toxicity of these antisyphilitic drugs, considerable confusion had arisen in the minds of many medical officers. The subject had to be investigated fully and a trial of British Mapharside initiated. Such matters required the closest coordination with the Medical Supply Division of General Hawley's office, and Lt. Col. Howard Hogan, MC, was most helpful in relieving the critical supply situation.

Colonel Pillsbury found that the standard of syphilis treatment in some hospitals could be improved and that he would have to investigate the standards

⁹ Circular Letter No. 74, Office of the Surgeon General, U.S. Army, 25 July 1942, subject: Diagnosis and Treatment of the Venereal Diseases.

in field units. In the U.S. Army, as in the Canadian Army, it would be necessary to hold occasional conferences of medical officers treating venereal disease because adequate direction or stimulation of interest in syphilotherapy could not be carried out by letters and directives alone. Various laboratory procedures, particularly facilities for dark-field and serologic diagnosis of syphilis, also needed improvement.

As the new year, 1943, came, "The above would indicate," wrote Colonel Pillsbury, "* * * that this Consultant has plenty to do. It is believed that work along these lines can produce a significant decrease in disability in ETO due to diseases included in the field of dermatology and syphilology."¹⁰

FORMULATION OF POLICIES AND PROCEDURES

During 1943 the problems of dermatology and syphilology became more clearly defined, permitting relatively clear lines of action to overcome them. The greatest room for improvement in the field of dermatology lay in the basic processes of diagnosis and treatment in the more easily curable, most prevalent conditions. To Colonel Pillsbury, these two questions were paramount: (1) What is necessary to keep the soldier, particularly the combat soldier, from man-days lost as a result of preventable or easily curable dermatologic conditions, and (2) what types of good treatment are most applicable in forward units? The theater senior consultant in dermatology and syphilology had to avoid scrupulously the temptation to investigate rare and interesting conditions or to conquer the conditions with a reputation for chronicity. The year also saw the engagement of the enemy in the North African and the Mediterranean areas. The campaigns in North Africa provided an opportunity to outline clearly the problems—particularly in the venereal diseases—that would be met under combat conditions.

Dermatology

Owing to an unfamiliarity among many medical officers of the various dermatologic conditions, the importance of skin diseases as a source of man-days lost was often overlooked. Of 2,093 admissions to the 10th Station Hospital during the later months of 1942, 10 percent were for a primary diagnosis of skin disease. The 5th General Hospital found that 6.8 percent of 7,049 admissions were for a primary diagnosis of skin disease. There were 14,408 admissions to all hospitals in the European theater during November and December of 1943. Of these, 1,035 cases were admitted with a primary diagnosis of skin disease. This was about 7.2 percent of total hospital admissions. But hospital admissions alone did not tell the whole story. Colonel Pillsbury interviewed many medical officers in both the European and North African theaters and found that the incidence of skin diseases at sick call in service and combat units ranged from 15 to 40 percent of all patients seen.¹¹

¹⁰ Annual Report, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 1942.

¹¹ Annual Report, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 1943.

Scabies and its complications, superficial pyogenic infections, fungus infections, seborrheic dermatitis, psoriasis, and various types of dermatitis and eczema constituted over 95 percent of the cases. It was not too much to expect of all unit and hospital medical officers to diagnose properly this 95 percent of dermatologic cases, but many could not. Medical officers in ETOUSA were, in general, less well trained in the diagnosis and treatment of skin diseases than in any other specialty, with the possible exception of ophthalmology. It was the exception, rather than the rule, for general hospitals, supposedly equipped to render the ultimate standard of medical care to the soldier, to have a trained dermatologist on the professional staff. There were only five medical officers in the theater who possessed a certificate from the American Board of Dermatology and Syphilology.

Colonel Pillsbury made particular efforts to train competent young medical officers in dermatology. This training had to be continuous, with regular supervision by the senior consultant or regional consultants in dermatology, in order to insure that the training efforts were being reflected in better standards of care.

One means of reaching the officer in the field was through meetings and talks. Colonel Pillsbury gave lectures on the diagnosis and treatment of skin diseases in the field at both the Medical Field Service School, Shrivenham, and the Field Service School of the Eighth Air Force, using a series of personally owned colored lantern slides. The British Ministry of Health film on scabies was also shown at the Medical Field Service School. During the year, Colonel Pillsbury led discussions, by invitation, at staff meetings of 10 hospitals in the theater.

On 12 November 1943, a meeting, sponsored by the Chief Surgeon's Office, ETOUSA, was held at the Royal Society of Medicine attended by 25 U.S. Army medical officers and certain guests of the United Kingdom and Canadian forces. Colonel Pillsbury believed that this was the first meeting devoted to dermatology ever held under auspices of the U.S. Army. Various aspects of the diagnosis, treatment, and management of scabies, pyoderma, psoriasis, eczema, and cutaneous lesions associated with meningococcemia were considered in individual sessions. There were discussions on (1) the superficial X-ray treatment of skin diseases, (2) the types of skin diseases requiring "boarding" or producing recurring disability or both, (3) the factors delaying involution of common dermatoses, and (4) the dermatologic disability in combat units. In addition, Brigadier MacKenna gave a talk on the organization of a dermatologic service. Maj. J. H. Twiston Davies, RAMC, dermatologist for the Southern Command, discussed recent experiences in military dermatology. A subject of considerable importance at the time, and one in which the average dermatologist could not be expected to have had much experience, was the dermatologic conditions that would occur should the enemy choose to use chemical agents on a large scale. This subject was expounded admirably by Col. William D. Fleming, MC, Chief, Gas Casualties Division, Office of the Chief Surgeon, Headquarters, ETOUSA. Material emerging from this ex-

change of views and information was later published in the *Medical Bulletin*, ETOUSA.

In the European theater, the vehicles for communication directed to the bulk of medical officers were circular letters of the Office of the Chief Surgeon, Headquarters, ETOUSA, and the *Medical Bulletin*. Circular Letter No. 77, 8 May 1943, was entitled "Diagnosis and Treatment of Scabies." In it, Colonel Pillsbury stressed the point that "only by prompt recognition of the disease before complications have developed and before other members of the unit have become infested, can scabies be controlled satisfactorily." It was pointed out that: "Unwarranted numbers of patients with scabies are being admitted to hospital in E.T.O. It is essential that medical officers should be familiar with the clinical features of this disease, so that an early diagnosis may be made, and prompt effective treatment carried out *in units*."

Four articles on the recognition and care of dermatologic conditions were published during the year in the *Medical Bulletin*.

Colonel Pillsbury continued to maintain the closest liaison with Canadian and British medical officers in dermatology. His relations with the Army Air Forces were extremely cordial, and ready agreement on improvements in the treatment of skin diseases was always obtained. On 2 July 1943, the chief address at the British Association of Dermatology and Syphilology was given by Colonel Pillsbury, on invitation. In his annual report for 1943, Colonel Pillsbury commented, as follows:

This consultant has attended all meetings of Command Dermatologists, British. Participation in the discussions at this meeting has been active, on request. Brig. R. M. B. MacKenna has been extremely cooperative in making available the collected data of the RAMC and his own wide experience in military dermatology. It is felt that our relations with British in this field of medicine have been particularly happy, and future complete cooperation is assured. This is particularly valuable, in view of the absence of any direction in the field of dermatology from the Office of the Surgeon General.

Special problems.—In any foreign theater, new medical problems arise that require special treatment methods. In the United Kingdom, the U.S. Army depended on British sources of supply for drugs and special equipment for dermatologic treatment. For example, Colonel Pillsbury realized upon his arrival in England that benzyl benzoate would be the ideal drug of choice for the field treatment of scabies. The British had shown that it was greatly superior to sulfur. The vehicle used by the British, a liquid Lanette wax emulsion, had certain disadvantages for use of troops in the field. In collaboration with British industrial chemists, an indefinitely stable and highly effective therapeutic preparation was devised for U.S. Army use (fig. 107). The developmental work with sulfonamide emulsion ointments proceeded as planned in conjunction with the Consultant in Plastic Surgery, ETOUSA, although such ointments were later discontinued because of their sensitizing properties. A very useful preparation, benzoyl peroxide ointment, was added to the nonstandard list and proved its value immediately (p. 312).

Superficial X-ray therapy became desirable for the treatment of certain skin lesions. In conjunction with the Senior Consultant in Radiology,

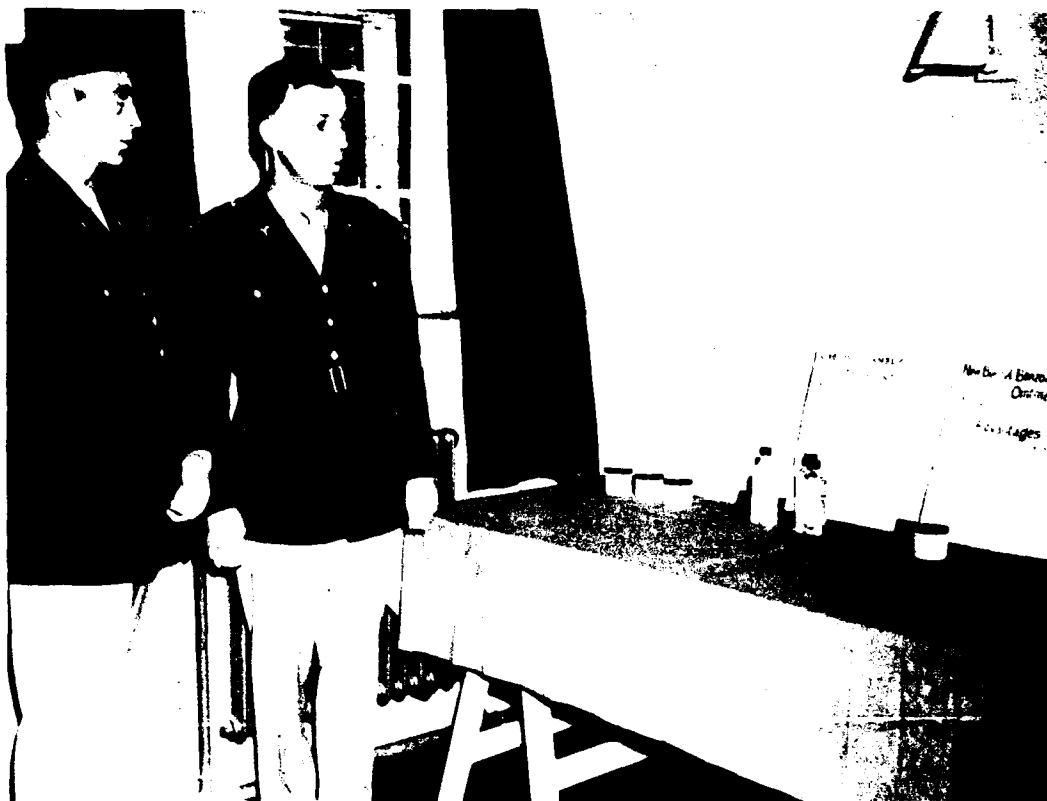


FIGURE 107. Medical officers viewing display of benzyl benzoate preparations for treatment of scabies, 5th General Hospital, Salisbury, Wiltshire, England, 1 May 1943.

arrangements were made for such therapy to be administered in selected civilian clinics, but the system did not prove to be entirely satisfactory. The facilities were limited in number and overworked, there was lack of control of the treatment given, and the possibility existed that the records of dosage would be lost. Approximately six such units were needed, but they were not available. It may be concluded that superficial X-ray therapy is not a method of treatment adaptable for use in an active theater of operations. The Finance and Supply Division of General Hawley's office was able to provide additional ultraviolet-therapy equipment, which was needed in England because of the lack of sunshine. Electrodesiccating units for the removal of partially disabling warts and papillomas were also provided and proved useful in the hands of competent medical officers. Such units were subject to misuse, however, in the hands of inexperienced physicians.

Among other collaborations required of Colonel Pillsbury were two special studies. The first of these had to do with the determination of toxicity of certain camouflage ointments being developed by the Engineers Corps. The test involved a sample of 200 men on whom such ointments were tried for irritant effect and sensitizing capacity. It was found that the ointments were satisfactory provided the formalin contained in them was replaced by a

nonsensitizing ingredient. The other was a study conducted in conjunction with the Preventive Medicine Division of General Hawley's office to ascertain causes and incidence rates of disabling fungus infections, which were markedly on the increase. In addition to certain deficiencies in preventive measures, it was found that the wearing of heavy British-issue socks during mild or warm weather was deleterious, and proper recommendations were made to the Chief Quartermaster, ETOUSA, to remedy this situation.

Syphilology

The problems that existed in the treatment of syphilis were brought to a sharp focus in March 1943, at the first general meeting of hospital medical officers in the theater for the purpose of discussing the treatment of venereal disease. This conference was called by Colonel Pillsbury in order (1) to provide an interchange of ideas and discussion of mutual problems in the field of venereal diseases, (2) to arrive at a mutual understanding and interpretation of various letters and directives from The Surgeon General and the Chief Surgeon, ETOUSA, and (3) to collect information for the Office of the Chief Surgeon, Headquarters, ETOUSA. The majority of conferees consisted of medical officers, laboratory officers, and nurses who were concerned with the control, diagnosis, and treatment of the venereal diseases. Whereas in the highest echelons, treatment and control responsibilities were clearly divided between professional and preventive medicine divisions and treatment responsibilities were further delimited with respect to gonorrhea and syphilis between the surgical and medical services, respectively, this was not necessarily the case in the field. In the smaller hospital units and commands, all of these responsibilities were, often as not, entrusted to one individual medical officer. Thus, attendance at this conference could not be confined to those officers whose treatment responsibilities were limited to syphilis alone. Accordingly, representatives from Headquarters, ETOUSA, also included Colonel Kimbrough, Chief, Professional Services Division; Major Padgett, Venereal Disease Control Officer, ETOUSA; Capt. John R. Poppen, MC, USN, from the U.S. Embassy; and Colonels Montgomery and Brown from Canadian Military Headquarters.

The primary problems discussed at this meeting were concerned with (1) deviation by medical officers in the field from treatment schedules specified in the 1942 Circular Letter No. 74 from the Office of the Surgeon General, (2) treatment of sulfonamide-resistant cases of gonorrhea, (3) interpretation and use of dark-field and serologic tests for syphilis, and (4) maintenance of proper records of treatment for syphilis. In addition, papers on the following subjects were read and discussed: (1) The diagnosis of early syphilis, (2) the treatment of sulfonamide-resistant gonorrhea, (3) the treatment of syphilis at a replacement depot, and (4) the difficulties in treating syphilis in a general hospital in the European theater. There was also a discussion of plans for the trial of intensive arsenotherapy of early syphilis.

It was fortunate for Colonel Pillsbury that so much of the discussion centered on the treatment of gonorrhea, which, at a later date, was to come into his field of responsibility.

As a result of this meeting and from experience gained through other sources, Colonel Pillsbury listed the primary problems in the diagnosis and treatment of syphilis to be (1) failure of continuity of treatment in units, (2) inadequacy of any method of prolonged treatment in men or units subject to repeated movement, (3) probable complete breakdown of antisyphilitic treatment in troops in combat conditions, (4) difficulties in maintaining adequate records and in insuring followup studies on completion of treatment, (5) inaccuracies in dark-field and serologic diagnosis of syphilis, and (6) difficulty in coordinating the efforts of all agencies concerned with the control and treatment of venereal disease.

The syphilis register and the supplementary record.—In order to assure continuity of treatment in patients on the standard 26-week schedule of therapy, a form called the Supplementary Record of Treatment, ETOUSA MD Form 313, was devised to be carried by the patient. This form was not intended to replace the syphilis register but to supplement it. It was developed after much consideration and after similar forms had proved their worth when used by the Royal Army Medical Corps and the Royal Canadian Army Medical Corps. Colonel Pillsbury believed that the newly devised form would be useful to the individual patient after his discharge from the service as well as provide essential information should his syphilis register become misplaced. Circular Letter No. 93, 24 May 1943, Office of the Chief Surgeon, Headquarters, ETOUSA, was published to govern the use of the new form. After a 6-month trial, Colonel Pillsbury was able to report that this supplemental record had demonstrated its value beyond doubt.

Circular Letter No. 74 from the Office of the Surgeon General provided that, on completion of treatment for syphilis, the patient would have a final physical examination, a spinal fluid test, and a blood serology (Kahn) test. Following this, if the results were satisfactory, the patient was placed on probation from treatment with serology (Kahn) tests made at intervals of from 3 to 6 months. The regimen was theoretically sound, but in practice it broke down. The key to the breakdown lay in the handling of the syphilis register of the individual patient. The registers were filed and not consulted or, worse still, misplaced. Colonel Pillsbury found the answer to this problem in the central inspection and control of the syphilis register. Circular Letter No. 106, 25 June 1943, Office of the Chief Surgeon, Headquarters, ETOUSA, directed that the syphilis register be forwarded to the Medical Records Division, Office of the Chief Surgeon, Headquarters, ETOUSA, upon completion of treatment. Colonel Pillsbury then inspected registers that contained discrepancies. If there were serious deficiencies in the treatment or in the tests of cure, the register was returned to the forwarding unit with appropriate instructions. Otherwise, the records were filed in the Medical Records Division, and requests for followup tests were sent out to the individual's unit at the proper time. After a 6-month

interval, Colonel Pillsbury assessed the advantages of this method to be: (1) It furnished a valuable means of determining that the soldier's treatment had been adequate and of correcting deficiencies early; (2) it gave reasonable, although not absolute, assurance that followup Kahn tests would be done; and (3) it offered protection against loss of the syphilis register. It was expected, of course, that certain difficulties would arise in the system once active combat operations commenced or when the theater was dissolved at the end of the war. Moreover, it was recognized that such a system might not be applicable to a less compact theater.

Success in establishing this system of central examination of the syphilis register was in large measure due to the wholehearted cooperation that was given by the Medical Records Division.

Laboratory problems.—Early 1943 found the situation in regard to serologic tests for syphilis unsatisfactory in several respects. Although British laboratories were very cooperative and helpful in making up for the lack of U.S. Army laboratory facilities then available, their standards varied considerably; there was no way to control the methods employed; reporting of results took many different forms; and no central reference laboratory existed for cross-checking their work. Furthermore, the inexperience of many medical officers in the field compounded these difficulties. Samples were being collected improperly. Both Colonel Pillsbury and Major Padget were highly concerned because patients were being submitted to unnecessary antisyphilitic treatment on the basis of fallible laboratory tests, when the case history or proper interpretation of tests would indicate that the diagnosis of syphilis was highly unlikely.

At Colonel Pillsbury's instigation, a conference was held in January 1943 between Major Padget and Lt. Col. Ralph S. Muckenfuss, MC, Commanding Officer, 1st General Medical Laboratory. As a result of this conference, Circular Letter No. 22, 4 February 1943, was issued by the Office of the Chief Surgeon, Headquarters, ETOUSA. In October 1943, it was revised and reissued by that office as Circular Letter No. 148. This directive specified control procedures, methods, and policies by limiting the performance of serologic tests for syphilis to those laboratories (fig. 108) specifically designated by the Chief Surgeon, ETOUSA, setting up the means for rapid transmission of samples and reports, specifying in detail when and under what circumstances the various laboratory tests should be performed, and establishing a system of interlaboratory checks.

When the meeting of hospital personnel concerned with the control and treatment of venereal disease was convened in March 1943, Colonel Pillsbury was able to report continuous improvement in regard to serologic tests for syphilis. With the cooperation of Colonel Muckenfuss, the laboratory situation was reaching a point where it was possible to lighten the load the British laboratories had been asked to carry. In addition, facilities and apparatus for dark-field studies had also been considerably increased.

The closest rapport was maintained by Colonel Pillsbury with the Preventive Medicine Division and the Director of Laboratories throughout the year



FIGURE 108. Serology Section, 1st Medical General Laboratory,
Salisbury, Wiltshire, England.

in maintaining better performance of diagnostic procedures for syphilis. The need was demonstrated time and again by instances of gross errors in the performance of dark-field examinations and serologic tests. Neither was a simple procedure to be performed by amateurs.

Intensive arsenotherapy.—It would not be proper here to discuss details concerning the intensive arsenotherapy of syphilis. The subject is adequately covered elsewhere in this series of volumes on internal medicine in World War II. It would be most appropriate, however, to record here the part that the Senior Consultant in Dermatology and Syphilology of the European theater played in pioneering the application of this method in military medicine.

In a letter dated 16 March 1943 to Colonel Kimbrough, Colonel Pillsbury recommended the adoption of a 20-day schedule of intensive therapy using Mapharsen or Mapharside. At that time, this was a grave and momentous decision on a subject that had engaged Colonel Pillsbury's attention from the first days of his arrival in the theater. For his guidance in making this decision there was very little of the data on the subject, although eventually data became voluminous. He had, however, a source of information in his close association with the Royal Canadian Army Medical Corps, which had already embarked on the plan experimentally. He had access to information from the Subcommittee on Venereal Disease of the National Research Council. He had personal correspondence with Dr. John H. Stokes and Dr. Joseph Earle Moore, and Major Padget also provided information and correspondence with authorities on the subject.

The opinions of those closest to the studies connected with the intensive arsenotherapy of syphilis varied considerably with respect to toxicity and schedules of optimum treatment. The National Research Council had not approved any plan for the Armed Forces. In fact, as late as October 1942, the Committee on Medicine of the National Research Council had recommended that:

* * * intensive arsenotherapy of early syphilis (including the five-day intravenous drip method) be considered as still in the experimental stage; that the optimum time-dose relationship still requires to be established by further animal and subsequent clinical experimentation; and that at present the method cannot be recommended for routine use by the Armed Forces.¹²

The committee, following a full discussion at the meeting and later study of data circularized to the committee, somewhat modified its previous stand by recommending a reconciliation between certain experimental data and the different types of suggested methods of therapy. Pending the acquisition of these data, the committee thought that:

* * * it seems undesirable for the committee to recommend the adoption of any very short and intensive method of treatment as a general procedure in the Armed Forces. However, the Armed Forces may well investigate the applicability of these methods to their own problems under certain conditions.

¹² Minutes, Thirteenth Meeting of the Committee on Medicine, National Research Council, 16 Oct. 1942.

Dr. Stokes, a member of the Subcommittee on Venereal Disease, had written in November 1942, as follows:

It is easily conceivable that there will be situations in which * * * the methods must and should be employed. The decision to employ them in this fashion does not lie within the recommendatory power of any advisory body, as the National Research Council Venereal Disease Sub-Committee has indicated, unless that power feels it can assume responsibility for an as yet unevaluated and not intrinsically uncriticizable experiment.¹³

On the other hand, the military situation facing the command in Europe indicated clearly that any prolonged method of treatment of syphilis was likely to be interrupted for various reasons, as it frequently was among operational aircraft crews. It appeared doubtful that adequate continuous treatment of syphilis could be maintained in all syphilitic patients by even the most competent and conscientious medical officers under conditions requiring extensive movement, maneuvers, or combat. Furthermore, early syphilis, which had to be treated to the point of noninfectiousness and adequate protection against infectious relapse, was the only real problem. There was nowhere near the number of cases of latent syphilis found in civilian practice in the United States. Although it was desirable that any method of treatment furnish reasonable protection against the development of late visceral syphilis, it could be considered unjustifiable to employ a time-consuming and difficult therapy in an active theater because of some slight reduction in the incidence of late syphilis 10 or 15 years later. In this respect, the treatment schedule outlined in Circular Letter No. 74 of the Office of the Surgeon General was, in itself, experimental. It was a 26-week compromise with the standard 12- to 18-month regimen, and there was insufficient clinical evidence to prove conclusively that it was adequate.

The chief disadvantage of the intensive treatment of syphilis was its inherent toxicity. Another disadvantage was the fact that intensive treatment methods would require more hospital beds. Based on the prevailing incidence, in certain units, of the number of patients given initial treatment in quarters compared to the number treated in hospital, the Medical Records Division of General Hawley's office estimated that, under the existing schedule, 1.7 beds per 1,000 troops were required, while 2.6 beds per 1,000 troops would be required under methods of intensive therapy.¹⁴ This consideration was far outweighed, however, by the savings in time of medical officers and the solving of problems incidental to treatment in units.

The out-and-out advantages of intensive methods of treatment were significant. It was estimated that infectious relapse, if it occurred, would reveal itself within 1-year after completion of treatment, thereby necessitating just a 1-year followup instead of the prevailing 2 years. Treatment could be completed in 95 percent or more cases, while being completed in not more than half

¹³ Stokes, J. H.: The Wartime Control of Venereal Disease. J.A.M.A. 120: 1093-1099, 5 Dec. 1942.

¹⁴ Letter, Lt. Col. D. M. Pillsbury, Senior Consultant in Dermatology, ETOUSA, to Col. J. C. Kimbrough, Director, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 16 Mar. 1943, subject: Intensive Treatment for Early Syphilis as a Substitute for the Present Six-Month Schedule.

the patients treated otherwise. The centralization required by intensive therapy would afford better control, place responsibility for treatment in the hands of few, insure proper completion of the syphilis register, and ease problems in medical supply.

The decision to embark on intensive treatment methods having been made, there yet remained the question of determining total dosage, dosage per injection, frequency of injection, and the total time over which intensive therapy should be given. Experimentation in animals and human beings had shown that slight modifications in the last three of these variables produced considerable differences in results, particularly with respect to the maximum tolerable dose. There were positive indications in the experimental data that the longer the time over which the total required dose of arsenical was given, the less mortality there would be from treatment. Dr. Moore had suggested in a personal communication to Major Padgett that a 10-week treatment schedule be used. This, obviously, was too long a period for hospital treatment, and such a schedule would nullify the advantages of intensive treatment. Colonel Pillsbury finally decided on a 20-day period of treatment with a total dose of approximately 1,200 mg. for a 150-pound patient. The total dose would be given at the rate of 40 mg. for the first day and 60 mg. for the succeeding 19 days.

The program as recommended by Colonel Pillsbury was approved by General Hawley and put into effect on an experimental basis in the 2d and 298th General Hospitals. It was subsequently extended to the 5th and 30th General Hospitals. The closest supervision was required on the part of the theater senior consultant in dermatology and syphilology, necessitating from 2 to 3 visits weekly. Following the successful trial in these hospitals, General Hawley approved further extension of this treatment to all general hospitals and certain other selected hospitals by Circular Letter No. 138, entitled "Intensive Treatment of Early Syphilis," issued from the Office of the Chief Surgeon, Headquarters, ETOUSA, on 10 September 1943.

By the end of 1943, approximately 1,200 patients with early syphilis had received intensive therapy without mortality. The average period of hospitalization for each patient had been only 25 days. Although no final statements could be made at that time, it appeared that the incidence of relapse would be no higher than, if as high as, with the standard 26-week schedule, and the serologic reversal rate was apparently satisfactory.¹⁵ The Canadian Army, which had suffered 4 deaths in 681 cases treated under its 6- to 10-day regimen, also adopted the 20-day treatment provided U.S. troops. In September 1943, Dr. Moore visited the theater and was apprised of the results of intensive therapy at a meeting attended by both U.S. and Canadian medical officers engaged in supervising and operating the program. Dr. Moore considered the results highly satisfactory, advised extension of the type of treatment being given to all troops in the European theater, and wholeheartedly recommended that the 26-week schedule be abandoned entirely within the theater.

¹⁵ See footnote 11, p. 283.

Recommendations Based on North African Experience

In late 1943, Colonel Pillsbury toured representative medical installations in North Africa for the purpose of observing methods of prevention and control of venereal and skin diseases. Between 15 November 1943 and 7 December 1943, he visited all base sections of the North African theater, with the exception of the Atlantic Base Section, and inspected 10 general hospitals, 6 station hospitals, 3 evacuation hospitals, 1 division clearing station, and 3 general dispensaries. The results of his tour were reported in a letter, dated 10 December 1943, to the Chief Surgeon, ETOUSA, through the Surgeon, NATOUSA (North African Theater of Operations, U.S. Army).

In addition to reporting conditions as he found them, Colonel Pillsbury made the following recommendations with respect to the control and treatment of dermatologic conditions and venereal disease in ETOUSA.

With respect to dermatology:

1. Continued attempts to inform and train field and hospital medical officers concerning the proper methods of initial treatment of pyoderma, fungous infections, and acute eczematous infections of the skin should be made. The early initial treatment is a crucial period in preventing undue disability therefrom. If only harm from treatment can be prevented, considerable will have been accomplished.

2. Bathing facilities for combat troops in ETO should be checked with a view to increasing their availability. It is believed that a considerable proportion of fungous and pyogenic infections can be entirely prevented by more frequent bathing.

3. Continued emphasis must be placed on the importance of good foot hygiene, and this must be appreciated as an essential command function. Arrangements have been made for distribution of four pairs of fresh socks weekly to combat troops in NATOUSA and it is recommended that plans for this be made in ETO.

4. Adequate consultative service in dermatology should be available to evacuation and station hospitals which have no officer trained in this specialty. Severe and chronic cases should be referred to general hospitals for special treatment or other disposition as rapidly as possible.

With respect to venereal disease control:

1. It is recommended that resolute and determined opposition be offered to any policy that condones the operation of houses of prostitution under Army supervision or cooperation, direct or indirect.

2. The paramount importance of immediate venereal disease control measures in occupied territories should be appreciated. A venereal disease control officer is an essential member of the initial medical organization.

3. It is recommended that active measures for venereal disease control be taken by whatever organization will be responsible for civilian administration. This is vital to an adequate program.

With respect to venereal disease treatment:

1. It is recommended that intensive therapy for early syphilis be continued in combat troops as long as the supply of hospital beds so justifies.

2. It is recommended that resistance be offered to any attempts to combine disciplinary measures and the treatment of venereal disease. It is believed that venereal disease stockades and rehabilitation training battalions as applied to every patient with venereal disease are unjust, and frequently interfere with adequate medical care.

3. The supply of penicillin available for treatment of sulfonamide-resistant gonorrhea should be increased as rapidly as possible consistently with the saving of lives in other infections. The saving of man days lost made possible by this method of treatment is very considerable.

In addition, Colonel Pillsbury realized the seriousness of the problem of immersion (trenchfoot) and the fact that treatment had been unsatisfactory. He recommended that every clinical and laboratory facility of the Office of the Chief Surgeon, Headquarters, ETOUSA, be made available for a thorough study of this condition with prompt transmission of results to the Surgeon, NATOUSA.

FULL-SCALE OPERATIONS

The period 1944 through the early months of 1945 was most characteristic of the activities of a consultant in an active theater of operations and, of course, the busiest. First, there was the planning for the invasion, then the invasion itself, and, following that, the mushrooming expansion of the theater in both troops and area. The initiation of active combat meant a preponderance of surgical casualties and a relative shortage of hospital beds for the treatment of nondisabling skin or venereal diseases. There was frequent movement of units and hospitals with continuous changes in missions and functions of the supporting medical elements. Evacuation policies had to be changed frequently in accord with tactical and other considerations. The main portion of theater headquarters moved from the United Kingdom to the Continent.

During this period, there was a complete revolution in the treatment of venereal diseases. In addition, the Medical Division of General Hawley's office was given responsibility for the diagnosis and treatment of gonorrhea, a responsibility that previously had been vested in urologists under the Surgical Division. Also, all the practices and procedures that had been carefully established during the early days of the theater now required the greatest effort and closest attention by the theater senior consultant in dermatology and syphilology to keep them operating as originally planned.

In late 1944, Colonel Pillsbury was ordered to the Office of the Surgeon General for a period of temporary duty in the United States.

Treatment of Venereal Diseases

Intensive arsenotherapy.—A total of approximately 4,000 patients with early syphilis received intensive arsenotherapy between April 1943 and July 1944 without any deaths from treatment. In mid-1944, however, this type of treatment was replaced by penicillin therapy. There were some indications that intensive arsenotherapy might still be required for penicillin-resistant cases and those suffering relapses. While intensive therapy was in progress, careful and constant supervision was required by the theater senior consultant and regional consultants in syphilology. The resulting absence of deaths proved the value of this supervision. Incidental to this mode of treatment were the careful keeping of followup records and the preparation of papers and speeches in response to many requests for summaries of the U.S. Army's

experience with the method. Although Colonel Pillsbury believed that the final cure rate would be somewhere between 85 and 90 percent,¹⁶ he doubted that intensive therapy could have been administered successfully under the conditions of later 1944 because of the shortage of hospital beds and the steady decline in the level of professional attainment of officers in hospitals arriving in the theater after July 1944.¹⁷

Penicillin therapy of gonorrhea.—The initial experience with penicillin therapy of gonorrhea in the European theater resulted in the cure of 94.7 percent of the first 1,000 patients treated. This therapy called for an injection of a total of 100,000 units of penicillin in from 5 to 10 divided doses. Its use was restricted to persons whose services were urgently needed and who could not carry out their duties efficiently while receiving sulfonamides. Later experience showed that penicillin therapy was effective in all but an almost negligible number of cases, in contrast to only 65 percent of cases successfully treated in field units with sulfonamides. Even after treatment in a hospital, there had previously been a residuum of from 10 to 20 percent of patients whose cure was very slowly effected, with complications of various sorts.¹⁸

The availability of penicillin had almost solved this difficult problem of military medicine. There remained for the consultant and others in subordinate positions the constant effort to have this treatment performed as far forward as possible. Eventually, Circular Letter No. 107, Office of the Chief Surgeon, Headquarters, ETOUSA, was published on 25 August 1944 prescribing the penicillin therapy of gonorrhea on an outpatient status as the method of choice, except that female personnel continued to be treated in hospitals. Colonel Pillsbury, realizing the great savings in manpower and hospital facilities with the use of penicillin, paid constant attention to the penicillin supply situation and, when the opportune moment arose, recommended that penicillin be used in the treatment of all cases of gonorrhea occurring in the theater.¹⁹

Penicillin therapy of syphilis.—In early January 1944, it became apparent that penicillin was also destined to occupy a preeminent role in the treatment of early syphilis. Keeping close watch over all the research that was being conducted, Colonel Pillsbury was convinced that penicillin therapy would offer a method of treatment for combat troops superior to that being used. His observations in the North African theater had shown conclusively that treatment of early syphilis within combat units was interrupted and unsatisfactory. Although no one could foretell what the final longterm effects of penicillin therapy would be, it was also known that inadequate treatment early in the disease was often worse than no treatment at all. On the other hand, there

¹⁶ Later surveys of such patients, though incomplete, indicated that intensive arsenotherapy had an effectiveness at or near that of penicillin in terms of absence of relapse and the percentage of negative spinal fluid examinations. However, it was obviously much more toxic.

¹⁷ Annual Report, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 1944.

¹⁸ Ibid.

¹⁹ Memorandum, Professional Services Division for Chief Surgeon, ETOUSA, 20 July 1944 subject: Penicillin Therapy of Gonorrhea and Syphilis.

could be no trial of penicillin therapy for early syphilis within the theater if there was any danger of jeopardizing the supply available for conditions threatening to life or for sulfonamide-resistant gonorrhea in which penicillin was practically always curative. Colonel Pillsbury discovered that supplies for such purposes were adequate and that possibly some of the supply might not even be used before it became outmoded. Accordingly, he did not hesitate to recommend a trial, in the European theater, of penicillin in the early treatment of syphilis.²⁰ The plan was approved and the experiment entrusted to Capt. (later Lt. Col.) C. R. Wise, MC, a regional consultant stationed at the 2d General Hospital (fig. 109). When Colonel Pillsbury visited the 2d General Hospital on 3 February 1944, five cases had already received or were undergoing treatment. Three of the patients had marked Herxheimer's reaction—fever and increase in the cutaneous lesions after the first injection—but, thereafter, the early lesions disappeared with a rapidity surpassing anything he had seen after arsenical therapy.

At the time of Colonel Pillsbury's visit to the hospital on 19 March 1944, a total of 15 cases had been treated, 8 with a total of 500,000 units and 7 with 1 million units. The method of treatment, as far as therapeutic response and absence of reactions was concerned, appeared far superior to either intensive or standard therapy.

On the basis of these 15 cases, the 7 March 1944 minutes of the Penicillin Panel, National Research Council, and personal letters from Lt. Col. Thomas H. Sternberg, Director, Venereal Disease Control Division, Office of the Surgeon General, Colonel Pillsbury recommended, on 26 April 1944, that a combined penicillin-bismuth-Mapharsen treatment be adopted for use in the treatment of combat troops and in the small number of patients in other units in whom arsenical therapy was not possible because of sensitivity to Mapharsen.²¹ At about the same time, he personally recommended to the Surgeon, Eighth Air Force, that penicillin treatment for syphilis be made available for operational crews. The Eighth Air Force surgeon requested such permission from the Air Surgeon, but it was denied.

Before his recommendations could be implemented, Colonel Pillsbury received from Dr. Stokes a personal letter dated 28 April 1944. Dr. Stokes stated that the Subcommittee on Venereal Diseases, National Research Council, had recently recommended the use of penicillin in the treatment of early syphilis, by the Army, under conditions in which continuity of standard treatment could not be maintained. In his letter, Dr. Stokes also indicated that modification of the previously recommended plan of treatment was necessary. While these modifications were being considered, The Surgeon General, in a letter which arrived at General Hawley's office on 1 June 1944.

²⁰ Memorandum, Senior Consultant in Dermatology for Col. J. C. Kimbrough, Chief, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 9 Jan. 1944, subject: Penicillin Therapy of Syphilis.

²¹ Memorandum, Professional Services Division for Chief Surgeon, ETOUSA, 26 Apr. 1944, subject: Penicillin Therapy in Syphilis.

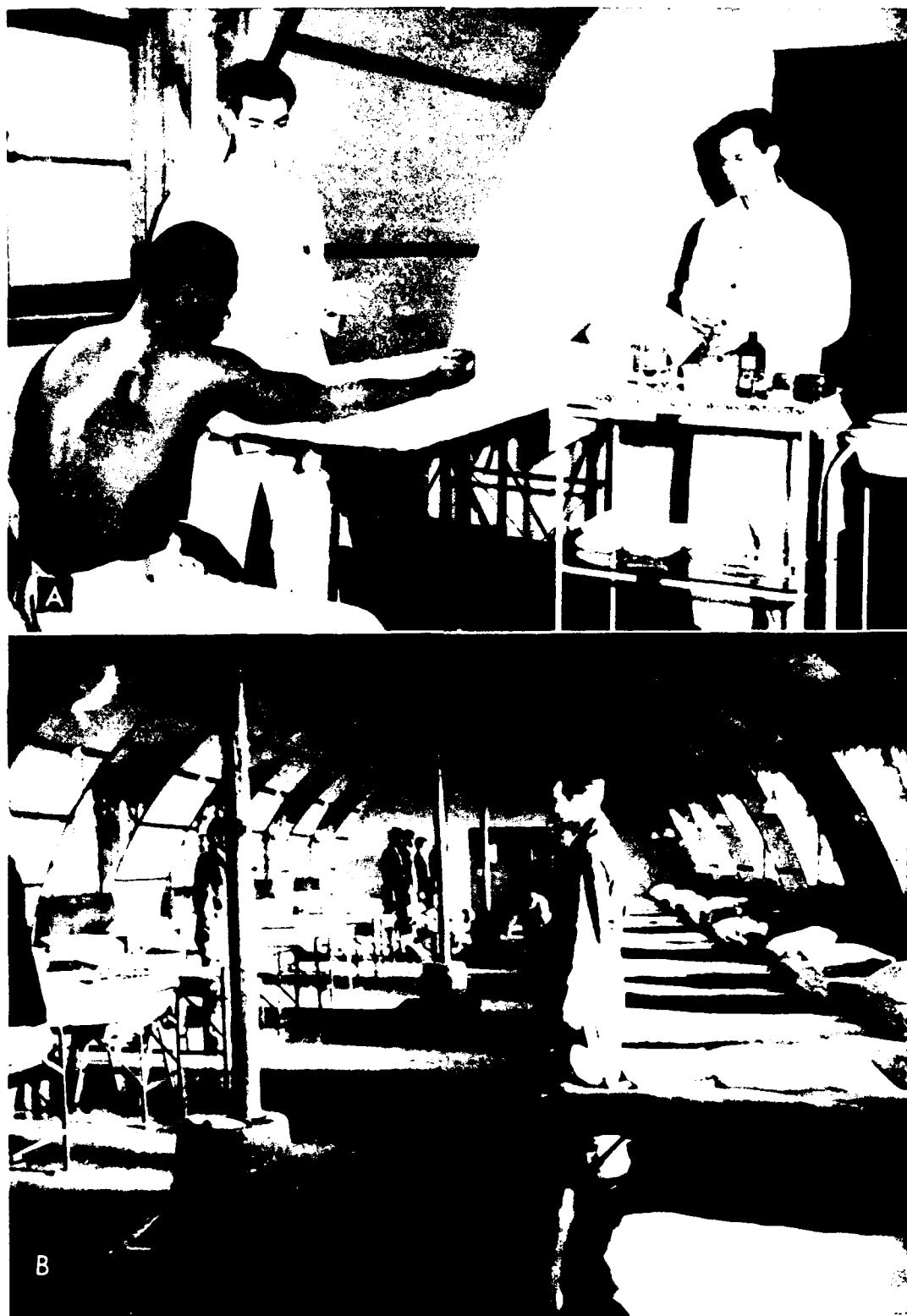


FIGURE 109.—Venereal disease ward, 2d General Hospital, near Oxford, England.
A. Taking blood specimen in clinic. B. View of ward.

authorized the use of penicillin in the treatment of early syphilis, with certain limitations and suggestions, as follows: ²²

Because of the recognized difficulties in carrying out the mapharsen-bismuth therapy of early syphilis in active Theaters of Operation, the following recommendations concerning the immediate use of penicillin as an anti-syphilitic agent are made. It is intended that this recommendation shall apply only to previously untreated cases, and that those cases in which mapharsen-bismuth therapy has already been initiated shall continue on such treatment.

a. That all new cases of primary and secondary syphilis be treated with penicillin in those areas or theaters where, because of the exigencies of the military situation, it may be expected that routine arsenical-bismuth therapy will not be carried out regularly.

b. That the schedule of treatment be 40,000 units intramuscularly every three hours for a total of 60 doses or 2,400,000 units per case. Preliminary experience with this dosage schedule indicates that better results than those obtained with 1,200,000 units may be expected.

c. That followup examinations should be obtained at monthly intervals for a minimum period of one year, in order that relapses may be detected early and mapharsen-bismuth therapy initiated without delay. The spinal fluid should be examined between the third and sixth month following treatment.

d. The syphilis registers should be properly maintained and transmitted with each move of the patient to assure adequate followup. Additional methods of earmarking these patients, such as central registries, may be considered desirable.

Following this, Circular Letter No. 86, Office of the Chief Surgeon, Headquarters, ETOUSA, subject: Penicillin Therapy for Early Syphilis, was published on 22 June 1944, citing penicillin as the drug of choice in the treatment of early syphilis in field and air forces. The prescribed treatment followed closely the recommendations of The Surgeon General, but followup procedures, particularly with respect to serologic and spinal fluid examinations, were modified to fit the needs of the theater.

Thus, it is seen that an essential part of a consultant's functions is to keep abreast of new developments, difficult as this is in an oversea theater. Although, eventually, specific recommendations reached the theater from The Surgeon General, the preliminary investigations that had been conducted within the theater proved extremely valuable. Before The Surgeon General's letter ever arrived, Colonel Pillsbury was able to coordinate in advance the implementation of penicillin therapy with the Surgeon, Third U.S. Army; the Consultant in Medicine and Venereal Disease Control Officer, First U.S. Army; and the Surgeon, U.S. Strategic Air Forces in Europe. When The Surgeon General's letter arrived, Colonel Pillsbury was able to evaluate its recommendations in the light of firsthand experience and with due consideration for the desires of those in the field. Had there been no preliminary experience with this type of therapy, a similar trial period would undoubtedly have been necessary. A few months can be very important during wartime. In this case, the significance of the few months' headstart which the European theater had in planning for penicillin therapy of syphilis is most evident. The Surgeon

²² Letter, The Surgeon General, to Commanding General, ETOUSA, Attn: Chief Surgeon, 24 May 1944, subject: Penicillin Treatment of Primary and Secondary Syphilis.

General's letter was received on 1 June 1944, less than a week before D-day, 6 June. Subsequent experience showed, too, that there was no reason to change the basic principles of treatment, followup, and recordkeeping that were initially established.

When the supply of penicillin became sufficient, its use in the treatment of early syphilis was extended by theater Circular Letter No. 107, August 1944, to all cases occurring in the theater.

Laboratory procedures.—With extensive deployment of troops on the Continent in 1944, specimens for laboratory examination had to be shipped greater distances while, at the same time, courier service became more unreliable. Tubes for the collection of specimens were not kept in proper sanitary condition, and the drawing of specimens was more likely to be performed carelessly. Disruption in the supply of stains and antigens also interfered with the essential laboratory tests.

Again, close liaison was necessary with the Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA, which supervised the laboratories. In the latter months of 1944, Lt. Col. (later Col.) Arthur P. Long, MC, Chief, Epidemiology Branch of the division, investigated and, together with Colonel Pillsbury, arrived at some remedial measures. On the Continent, prepared tubes containing a requisite amount of Merthiolate (thimerosal) were put into use, and, in the United Kingdom, the practice of placing 4 mg. of sulfanilamide in spinal fluid specimens was adopted to prevent contamination. Problems in courier service eventually were alleviated to some extent by performing all spinal fluid tests on the Continent.

Other problems.—During this period, Colonel Pillsbury was also concerned with the management of cases of latent syphilis and neurosyphilis, the few cases of penicillin-resistant gonorrhea, and with experimentation in the use of BAL for the treatment of agranulocytic reactions to intensive arsenotherapy (p. 313). TB MED (War Department Technical Bulletin) 48, in early 1944, established policies and procedures on an Armywide basis for the management and treatment of neurosyphilis. Many provisions of this technical bulletin were obviously inappropriate as applied to the European theater, and a suitably abridged and condensed version was prepared for promulgation within the theater. Satisfactory provisions were made for the treatment of penicillin-resistant cases of gonorrhea by transferring them to the Royal Victoria Hospital for fever therapy under the expert supervision of Lt. Col. Ambrose King, RAMC.

The syphilis registers.—The practice of holding syphilis registers centrally at the theater headquarters and reviewing them there required the frequent attention of the theater senior consultant in dermatology and syphilology. The problem of finding the necessary time to review registers became more acute when the theater headquarters was divided into two portions, one on the Continent and one remaining in the United Kingdom Base. Colonel Pillsbury was on the Continent, and the registers were kept at the Medical Records Division, United Kingdom Base. As time passed, it became more necessary

for Colonel Pillsbury to scan these registers personally since they were used to assess and collect data on the results of intensive therapy and penicillin therapy. Colonel Pillsbury eventually found himself spending 2 or 3 days at regular 2- to 3-week intervals to review the syphilis registers on which there were questions as to the adequacy of treatment provided.

Colonel Pillsbury was able to report, in August 1944, that, through 20 August, 8,471 had been received in the Medical Records Division for advice, closure, and holding for followup checks. The medical decisions on all these were rendered by the Professional Services Division. An analysis of 1,920 registers received between 15 June and 22 July 1944 showed that 536 (28 percent) had been returned to units for information essential to closure or further treatment, 925 (48 percent) had been closed and sent to the Office of the Surgeon General, and 459 (24 percent) were held for followup tests. Colonel Pillsbury considered this analysis representative of the usual workload.

In a letter to Colonel Pillsbury, dated 18 September 1944, Colonel Sternberg in the Surgeon General's Office wrote of this system in warmly laudatory terms:

We get in fifteen hundred registers a week and we have to check them all over to see that they are satisfactory and return those which are not. It is a real pleasure to get in a box from ETO and it saves us a tremendous amount of work. I would like to adopt your system for our method of handling in the ZI but it is absolutely out of the question because of several thousand new cases of syphilis a month in addition to eight to ten thousand inducted syphilitics per month, which would require a tremendous office staff just to handle them.

Treatment of Skin Diseases

The treatment of skin diseases saw no such dramatic changes as those that occurred in the treatment of the venereal diseases. The only advances that approached these in significance were the local penicillin therapy of certain dermatologic conditions and the use of DDT in combating pediculosis. Improvements were made by the strenuous application of more superficial measures, such as emphasizing standard methods of treatment, shifting skilled personnel to where they could do the most good, insuring adequate supplies of drugs, and centralizing hospitalization facilities for the treatment of skin conditions. It was still just as essential during this period, as it was during the earliest days of the theater, to emphasize to the point of monotony the dangers of overtreatment.

To a considerable extent, the difficulty lay in the inadequate professional training of many medical officers in the diagnosis and treatment of skin diseases, a deficiency of medical school training that the Army could overcome only in part. On 26 June 1944, in a letter to Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General, Colonel Pillsbury wrote:

I have been very much impressed with the extreme variation in training in dermatology which is offered by various medical methods. The teaching in this specialty in some schools is very inadequate, either because of lack of time on the curriculum or because of poor pedagogic methods. I feel deeply on this score, and intend to do something about it after the war.

There is no reason in the world why every medical student should not become perfectly familiar with the characteristic picture and the chief variations of the eight or ten diseases which will comprise over 90% of all skin cases. He should also be well ingrained in the standard methods of treatment, at least to the point where he will not do harm by treatment. Competent internists are often surprisingly inept in dermatologic diagnosis. I think this is largely attributable to poor teaching methods in the past, to a failure to arouse their interest, and to the abominably complex terminology of dermatology.

On the other hand, the difficulty also lay in the fact that there were some basic disturbances in skin physiology for which available methods of treatment were, at best, unsatisfactory. The only solution to these problems lay in extensive scientific investigations on a much broader physiologic base than in the past. In the letter to General Morgan just mentioned, Colonel Pillsbury stated that the following conditions falling in this category were of particular significance in the European theater: (1) Inflammatory eruptions of the hands and feet, including especially the disturbed vasomotor states that regularly accompanied them; (2) itch; (3) psoriasis; (4) seborrheic dermatitis; (5) fungus infections of all types both in their preventive and therapeutic aspects; (6) allergic conditions of various types, including atopic dermatitis, in which methods of treatment were highly unsatisfactory and too cumbersome for military medicine; (7) pyodermas, with a great need for more rapidly acting, nonsensitizing methods of reducing bacterial flora of the skin; and (8) warts, particularly plantar.

In spite of the difficulties encountered, there were, nonetheless, indications that the efforts made to improve care and treatment of skin diseases were paying dividends. Scabies, although posing a constant threat, never approached the staggering rates of World War I, when it was responsible for some 30 percent of all evacuations from the British Expeditionary Force. The number of patients evacuated to the Zone of Interior for skin diseases remained constantly low, approximately from 30 to 40 cases per month.²³

Planning for Invasion of the Continent

Venereal diseases.—After visiting the North African theater, Colonel Pillsbury was impressed with the absolute necessity of coordinated plans for the prevention and control of venereal disease on the Continent after D-day. There were also intelligence reports which indicated that venereal disease among the civilian population of France and the Low Countries was increasing. This factor, plus the shortage of drugs and physicians in those countries, indicated that exposure of U.S. soldiers to persons with infectious venereal disease would be greatly increased and that a rise in the venereal disease rate could be expected. It was obvious, owing to several factors, that venereal disease in combat soldiers would be badly handled within the army areas unless special provisions were made. There would be a shortage of facilities in field and evacuation hospitals for adequate diagnosis, and the large number of surgical casualties would have priority over patients with venereal disease.

²³ See footnote 17, p. 196.

In North Africa, these factors had led to erroneous diagnoses and unwarranted evacuation of patients to fixed hospitals with the resultant loss in manpower. It was now fully realized that a patient with active venereal disease would prove to be just as much a casualty from the standpoint of combat usefulness as a man with a crippling wound and presented, moreover, a great opportunity to reduce noneffectiveness within the armies. Improved methods of treatment had made it possible to care adequately for such diseases entirely within an army area and, in almost all instances, to return the patient to his unit entirely cured. Obviously, the closest correlation of duties and responsibilities of various medical officers concerned with venereal disease control and treatment activities was indicated.

On 4 January 1944, in a memorandum to Colonel Kimbrough, Colonel Pillsbury recommended that a meeting be held to consider all aspects of the venereal disease problem and to formulate plans that would better anticipate and provide for the complex problems that could be expected to arise. In addition to himself, he suggested that the following attend: Chief, Preventive Medicine Division, and Chief, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA; Venereal Disease Control Officer, ETOUSA; Consultant in Urology, ETOUSA; and representatives from the Eighth Air Force and First U.S. Army.

The meeting was held on 29 January 1944. Colonel Pillsbury and Major Padget were directed to formalize the recommendations of this ad hoc committee. The memorandum prepared by these two officers on 15 February 1944 and presented to General Hawley discussed general considerations on which the recommendations were based and made specific recommendations with respect to prevention, prophylaxis, punitive measures, diagnosis, and treatment of venereal diseases.

The recommendations with respect to diagnosis were (1) that facilities for the differential diagnosis of ulcerative penile lesions be made available as far forward as possible—it was believed that evacuation hospitals were the most advanced hospitals in which the necessary procedures could be carried out satisfactorily—and (2) that Kahn tests for syphilis be performed only as far forward as station hospitals.

The recommendations concerning treatment were fourfold, as follows:

1. That the policy of treatment of gonorrhea in units be continued.
2. That treatment for acute urethritis be given promptly, whether or not laboratory facilities for the examination of smears were available.
3. That intensive treatment of early syphilis be continued and that it be administered as far forward as facilities would permit. The policy of giving such treatment only in fixed hospitals designated by the Chief Surgeon, ETOUSA, should be continued.
4. That a strong policy be adopted against the establishment of venereal disease stockades or other similar treatment centers in which disciplinary and punitive measures might interfere with the adequate medical care of patients with venereal disease.

Following this conference, Colonel Pillsbury was busy coordinating activities with other divisions in theater headquarters and particularly in working with representatives of the First U.S. Army and, when it arrived in Europe in March of 1944, with the Third U.S. Army. In addition, it was necessary for him to confer with the many subordinate consultants in the various supporting commands and fixed hospitals that were designated to receive the evacuees.

As D-day approached, Colonel Pillsbury was able to report on the problems that had been given first consideration and the plans that the First and Third U.S. Armies had completed.²⁴ At this stage, it appeared that the following were problems that would have to be overcome:

1. Misdiagnosis of penile ulcers because of a lack of dark-field equipment or unfamiliarity of medical and laboratory officers with dark-field diagnosis, unwarranted dependence on spirochetal stains or on gross morphologic characteristics of ulcers for diagnosis, and misdirected attempts to do diagnostic serologic tests for syphilis in evacuation hospitals.

2. Evacuation of venereal patients too far back in the combat or communications zone because of a lack of facilities for proper diagnosis, the pressure of more crucial medical or surgical problems in evacuation hospitals, and the lack of interest on the part of medical officers in forward units in properly caring for the venereal diseases.

3. Regarding all venereal disease as an offense requiring disciplinary measures.

4. Serious and dangerous interruption of continuity of treatment for syphilis.

5. Persistence in sulfonamide therapy for gonorrhea for unjustified lengths of time.

The medical personnel of the two armies had fully accepted the general principle that early diagnosis and treatment of venereal diseases had to be accomplished within the armies and that the administrative and technical means were at hand to achieve this end. Accepting also the fact that very few medical officers were really competent in the diagnosis of ulcerative penile lesions, they were in agreement that some centralization of facilities was necessary. Accordingly, the First U.S. Army planned to set up a center for the diagnosis and treatment of such patients in a convalescent hospital. The professional service of this center was placed in charge of an expert venereologist, Capt. (later Maj.) James M. Howell, MC, transferred thereto from the 10th Station Hospital. A unit of the army laboratory, with an expert dark-field technician and serologist, was also attached.

The Surgeon, Third U.S. Army, however, favored centralization to a less degree. He planned to attach a platoon of a clearing company to each of three evacuation hospitals to care for venereal disease patients in tented expansions to these hospitals. A medical officer trained in venereal diseases was to be

²⁴ Memorandum, Colonel Pillsbury, for Chief, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 14 May 1944, subject: Diagnosis and Treatment of Venereal Diseases in the Combat Zone.

assigned to each of these hospitals and dark-field and serologic facilities provided from the army laboratory.

All concerned generally agreed that penicillin should be used for the primary treatment of gonorrhea occurring in combat troops and that, under any circumstances, persistence in sulfonamide treatment for periods longer than 10 days was inadvisable. The surgeons of both armies wanted to introduce the penicillin treatment of early syphilis as soon as possible.

As D-day became imminent and it was realized that, of the two armies, only the First would make the initial assault on the mainland of Fortress Europe, a meeting was held in the Office of the Surgeon, Headquarters, First U.S. Army, to make final plans for the diagnosis and treatment of venereal disease in the First U.S. Army. It was attended by Lt. Col. (later Col.) John W. Claiborne, Jr., MC, Commanding Officer, 4th Convalescent Hospital; Lt. Col. Cornelius A. Hospers, MC, Commanding Officer, 10th Medical Laboratory, First U.S. Army; Lt. Col. (later Col.) Tom F. Whayne, MC, First U.S. Army Group; Maj. Samuel L. Stephenson, Jr., MC, Venereal Disease Control Officer, First U.S. Army; and Captain Howell, 4th Convalescent Hospital. The final plans adhered closely to the original plans just described for the First U.S. Army. In addition, the decision was made that penicillin would be used for the treatment of early syphilis. Personnel from First U.S. Army agreed to provide necessary information on cases so treated so that there could be proper followup of these patients. It was also agreed that the number of spinal fluid examinations at the venereal disease center of the 4th Convalescent Hospital would, initially, be kept to an absolute minimum. It was further agreed that routine tests for closure of syphilis registers were out of the question for some time. In addition, Colonel Claiborne and Major Stephenson earnestly requested that Colonel Pillsbury participate on the spot in helping to set up and initiate operations of the venereal disease center. The Surgeon, First U.S. Army, concurred in this request, and it was approved by the Chief Surgeon, ETOUSA.²⁵

As the Third U.S. Army made final preparations to cross the Channel in July 1944, the Surgeon, Third U.S. Army, voiced a desire to modify the preliminary plans. He wanted permission either to conduct intensive arsenotherapy in hospitals within the army or to use the standard 26-week schedule of therapy.²⁶ He was assured there was every reason to believe that the supply of penicillin would permit its use in all cases of early syphilis arising in the army and that provision would be made for transfer of patients to general hospitals for intensive arsenotherapy should penicillin be unavailable. The Third U.S. Army surgeon, nevertheless, stood fast in his demands. Accordingly, permission was granted Third U.S. Army to conduct intensive arsenotherapy in specifically designated hospitals, when and if necessary, in place of penicillin

²⁵ Memorandum, Lt. Col. D. M. Pillsbury, for Col. J. C. Kimbrough, Office of the Chief Surgeon, Headquarters, ETOUSA, 21 May 1944, subject: Venereal Disease Diagnosis and Treatment in First Army.

²⁶ Memorandum, Professional Services Division, for Chief Surgeon, ETOUSA, 3 July 1944, subject: Management of Syphilis in Third Army.

therapy. The stipulation was added that a medical officer trained in intensive arsenotherapy must be transferred to the hospital so designated.

When put to test in combat, the plans formulated by First U.S. Army proved outstandingly successful. During the first 4 months of operation, 947 patients were admitted to the venereal disease center of the 4th Convalescent Hospital. Of these, 88 had to be transferred, either to another section of the convalescent hospital or to a general hospital. Thus, over 90 percent of those admitted were returned directly to duty. Moreover, the diagnosis of a venereal disease was confirmed in only 9 of the 88 patients not returned directly to duty. The practice of treating venereal disease at one central place conserved beds in more active installations and permitted the concentration of trained personnel so that more effective treatment could be administered.²⁷

The plan worked best, however, when the army was confined to a relatively small front. The army laboratory (fig. 110) was located with the convalescent hospital, and it was not necessary to detach a unit to perform the dark-field and Kahn examinations. As the army expanded and the situation became mobile, the hospital and laboratory separated, and patients had to be moved from 5 to 100 miles for laboratory examinations at a time when transportation was scarce and the vehicular routes congested. Eventually, a portion of the laboratory had to be assigned to the hospital as called for in the original plans. Contrary to the advance planning, the laboratory performed extensive spinal punctures, not only for diagnosis but for the closing of syphilis registers. The fluids were transported to the United Kingdom by aircraft, but during the first month of operation over 50 percent of the specimens reached the central laboratory in an unsatisfactory condition. Again, the wisdom of the advance plans was supported. Spinal punctures for the closing of syphilis registers had to be deferred. Above all, the greatest problem was the immobility of the venereal disease center as a part of a convalescent hospital. The front at one time so outdistanced the center that another unit had to take over its functions temporarily. There was not enough transportation to move the center and not nearly enough personnel or equipment to establish two centers that could continue to advance by leapfrogging.

When the use of penicillin had proved itself in the duty-status treatment of gonorrhea and in the treatment of early syphilis, the venereal disease treatment plan for the Third U.S. Army was eventually modified, in practice, to parallel that of the First U.S. Army.

Dermatology.—The planning for care of dermatologic patients was based on the fact that the dermatologic load in a hospital was directly proportional to its station hospital functions and the number of troops in its immediate area of responsibility. This meant that the majority of these patients would eventually be seen on the Continent. Furthermore, any need to evacuate patients from the Continent to the United Kingdom or the Zone of Interior would represent a serious failure in professional service since in most derma-

²⁷Annual Report, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 1944, with Exhibit D, thereto.



FIGURE 110. 10th Medical Laboratory, First U.S. Army, La Cambe, France, 21 July 1944. A. Setting up the laboratory tents. B. Serology tent.

tologic conditions cure and return to duty was feasible within the limits of any reasonable evacuation policy, such as 30 days. On these premises, the decision was made to supply hospitals being transferred to the Continent with specially trained medical officers insofar as the number of officers permitted. The remaining officers who would have to care for the severe and disabling dermatologic cases evacuated to hospitals in the United Kingdom were centralized in hospital groups to permit the optimum care and management of such patients.

Hospitalization and Evacuation

At frequent intervals, Colonel Pillsbury was required to take an active part in solving hospitalization and evacuation problems insofar as they concerned patients with diseases of the skin or venereal diseases. In most cases, the problems were local; that is, their solution rested in the hands of surgeons on the staffs of subordinate commands. Problems in this area were usually discovered during field trips. In other cases, reports of improper or unsatisfactory treatment revealed that the cause and the cure lay in the establishment and enforcement of evacuation procedures or hospitalization plans.

For example, in late 1944, after the theater had grown tremendously, there occurred sporadic cases of patients being evacuated during the course of penicillin treatment for syphilis. This interruption of treatment necessitated the initiation of another complete series of treatments and was wasteful of medical facilities, personnel, and supplies, and, in addition, jeopardized the ultimate cure of the patient. Colonel Pillsbury had to confer with the surgeons and representatives of commands in which such discrepancies were occurring in order to fix stringent requirements for the completion of treatment once it was started.

In another instance, the French had requested help in the treatment of early or sulfonamide-resistant cases of gonorrhea, which were accumulating in the French Military Hospital at Val de Grace. Colonel Pillsbury inspected the hospital and discovered that 30 or 40 patients a month were admitted who required penicillin therapy. Arrangements were made to care for these cases in the 217th General Hospital with the approval of the Surgeon, Seine Base Section, in whose area the hospital was located, under conditions satisfactory to the French and the hospital authorities.

Previously, centralized treatment centers for dermatologic care in the United Kingdom were mentioned. These had to be established because hospitals arriving from the Zone of Interior were staffed by increasingly less experienced and less well trained medical officers. On the other hand, the number of dermatologic patients in each general hospital was so small as to occupy only a fraction of the time of a specialist.

Obviously, two solutions were possible—centralization of patients or the use of peripatetic consultants. Both were used, but the former proved much the more effective. In September 1944, such a center was in operation at the 192d General Hospital of the 15th Hospital Center. Here, there was

assurance of accurate diagnosis and disposition. Such centralization also facilitated the collection of information as to the incidence of various conditions and effectiveness of treatment. Moreover, patients could be further centralized on one or two well-run wards with adequate facilities for special examination and sufficient supplies of the common ointments, solutions, and other necessary medicinals. Above all, specialized dermatologic wards helped to insure the interest of wardmen and nurses in the care of these patients. Good treatment effected in this manner paid off in the saving of hospital-bed days per patient. The difference in length of hospitalization between good diagnosis and treatment and bad was particularly marked in dermatologic conditions.

Classification, Training, and Assignment of Personnel

The adequacy in numbers and in training of dermatologists was the primary personnel problem, owing to the fact that diagnosis and treatment of diseases of the skin could not be standardized to the extent that standardization was possible in the venereal diseases. In addition, some older officers with special training in dermatology were so immersed in the specialty and so narrowed in their outlook as to make them unadaptable to Army medical practice and to duty outside their particular specialty. On the other hand, medical officers trained in dermatology in the 10 to 15 years before the war in certain civilian graduate centers proved extremely valuable. It was this small group that carried the load as regards the return to duty of really difficult cases. The number of medical officers in the theater with any training in dermatology, including A, B, C, and D classifications, was 47 as of the end of 1944. This number was so few that a trained dermatologist could not even be assigned to each general hospital in the theater, although well-conceived hospitalization policies alleviated this need. However, when the First U.S. Army indicated a need for a dermatologist to be assigned to the army surgeon's staff, Colonel Kimbrough flatly refused to consider such an assignment of dermatologists.²⁸

The problem of providing adequate service with a limited number of officers was met by interviewing and assessing the professional qualifications and experience of each dermatologist and assigning him where he could be most fruitfully employed. Those who were not full-trained dermatologists but were filling positions as such were also interviewed to determine their ability to carry the load expected of them and to help them acquire any training or experience that would make them more capable. Some officers whose professional qualifications justified their assignment as ward officers in dermatology and syphilology in a general hospital nevertheless required training in methods particular to the theater and in military hospital administration procedures. In September 1944, all dermatologists assigned to

²⁸ Memorandum, Lt. Col. D. M. Pillsbury, for Chief, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 24 Oct. 1944, subject: Report of Visit to First and Third Armies with Comment No. 2, Col. J. C. Kimbrough to Chief Surgeon, ETOUSA, thereto.

hospitals in the United Kingdom were classified as "medical officers of top special ability, fully qualified to act as regional consultants in dermatology and venereology," and "medical officers with special training, but for various reasons not quite so well qualified to act as regional consultants." In December 1944, Colonel Pillsbury and Maj. (later Lt. Col.) Charles J. Courville, MC, who had functioned as the theater senior consultant in dermatology and syphilology during Colonel Pillsbury's temporary duty in the United States, classified all dermatologists in the theater as to their professional ability.

It was no small problem to keep track of dermatologists during the height of activities in the theater. Either the units to which dermatologists were assigned would be moved or the hospitalization responsibilities of the units would be changed. A hospital center whose consultant in dermatology was assigned to one of its component general hospitals would suddenly find itself without a consultant when the particular general hospital was transferred elsewhere. A dermatologist assigned to a particular hospital would suddenly find himself treating no skin diseases and performing sundry other duties upon change of the hospital's mission. Malassignments, once they had been permitted to occur, were difficult to correct, and exceedingly delicate readjustments were sometimes necessary. To effect transfers, Colonel Pillsbury had to obtain concurrences from the individuals concerned, from the commanding officers of gaining and losing hospitals, and often from one or more area commands. Commanding officers of hospitals and surgeons of commands, jealous of their prerogatives, often refused to countenance transfers of personnel that were desired by the theater senior consultant in dermatology.

The direct instructional and training activities engaged in by Colonel Pillsbury, or carried on under his supervision, included the following: (1) Instruction to medical officers in field medical and hospital units regarding the diagnosis and treatment of common skin diseases through lectures at the Medical Field Service School and the Eighth Air Force Field Service School; (2) continued widespread showing of the Ministry of Health film on scabies; (3) providing opportunities for medical officers to attend professional meetings and conferences, such as the monthly meetings of the section of dermatology, Royal Society of Medicine; (4) frequent and timely articles in the *Medical Bulletin* of the European theater; and (5) on-the-job training of interested young medical officers with some training in dermatology or venereology.

The on-the-job training took two forms. One way was to place potential specialists in charge of a ward and have their work frequently supervised and reviewed by visiting consultants. These visits were made at least once weekly. Another method was to place the trainee on temporary duty at an installation where a qualified medical officer was operating a large service. A typical report of on-the-job training accomplished with four medical officers is as follows:

1. The following officers were on detached service at this hospital for training in the technique of 20 day intensive arsenotherapy from 16 April 1944 to 29 April 1944 * * *.

2. In the training of these officers our facilities and cases were used to give them experience in clinical and laboratory diagnoses of various venereal diseases and the technique of administering arsenicals. Problem cases and treatment reactions were discussed in group meeting and ward rounds. They became familiar with the administrative details by preparing the records for admission and discharge of patients. In addition a discussion on this subject was given by the registrar of this hospital.

3. The group as a whole was enthusiastic and cooperative and gave evidence that when placed in charge of this type of patient would be able to give a good account of themselves. It might be mentioned that none of these men have had the opportunity of practicing clinical medicine for approximately two years.²⁹

Visits to Field Installations

Colonel Pillsbury found it essential to make frequent recurrent visits to hospitals and installations in the field. These visits enabled him to have a grasp of the general situation as it really was at the operating level. It also enabled him to check on the manner in which programs and directives were being carried out, to consult on difficult cases, to conduct ward rounds, and to advise the hospital, local command or, when necessary, the theater headquarters on problems he had discovered (fig. 111). Coming on top of his other duties, field trips took a considerable toll of his time and energy. Field trip duty was hard unremitting labor, but essential work, and the theater senior consultant had to be durable.

Some visits to hospitals were conducted for limited, specific purposes; others were concerned with more general matters. During the period when many casualties from the North African and Mediterranean theaters were being received in the United Kingdom, there occurred frequent cases of an irritating dermatitis variously referred to as "Sicilian itch" and "desert sores." These had to be seen by the European theater senior consultant in dermatology. During Colonel Pillsbury's period of temporary duty in the United States, Major Courville surveyed all hospitals in the Normandy and Brittany Base Sections to evaluate services for the treatment of dermatologic and venereal disease patients, particularly with respect to the qualification of medical officers assigned to these duties.³⁰ When General Morgan visited the theater in March 1945, Colonel Pillsbury was one of those who accompanied General Morgan and Colonel Middleton through various medical facilities and installations on the Continent.

Research and Development

During the period of 1944-45, which was occupied primarily with medical support of the Army in combat, time was nevertheless found for activities in applied research, principally directed to the solution of problems as they arose in the theater, for which there was no immediate available answer.

²⁹ Letter, 298th General Hospital, to Chief Surgeon, Western Base Section, ETOUSA, 4 May 1944, subject: Training in Intensive Arsenotherapy.

³⁰ (1) Letter, Maj. C. J. Courville to Surgeon, Normandy Base Section, ETOUSA, 20 Nov. 1944, subject: Facilities for Treatment of Dermatologic and Venereal Disease Cases in Normandy Base Section. (2) Letter, Maj. C. J. Courville to Surgeon, Brittany Base Section, ETOUSA, 1 Dec. 1944, subject: Survey of Facilities for Treatment of Skin and Venereal Cases in Brittany Section.



FIGURE 111. Colonel Pillsbury, second from right, putting across a point to (left to right) Col. David L. Lorton, Deputy Chief Surgeon, ITOUSA; Col. Arnevald C. Anekoren, Chief, Troop Movements and Training Branch, Operations and Training Division, Office of the Chief Surgeon; and Col. Howard W. Dunn, Executive Officer, Office of the Chief Surgeon.

Preparations for use in scabies. The preliminary work done in the developing of benzyl benzoate for the treatment of scabies has been described (p. 285). During 1944 and 1945, benzyl benzoate was used on an increasingly wide scale in spite of occasional supply problems. It proved highly satisfactory, especially for treatment given in unit dispensaries. The rate of cure, provided the therapy was carried out with strict adherence to a few simple details, was more than 95 percent. The benefits resulting from development of benzyl benzoate as a treatment for scabies was not to be limited to the European theater alone. In early 1944, The Surgeon General requested information on the results of its use in Europe, and, in reply on 24 January 1944, General Hawley gave him detailed information on all aspects of the matter. Among other things, General Hawley was able to state that the emulsion and method of treatment in use had proven satisfactory as regards clinical effectiveness, nonirritativeness, and stability in the temperatures encountered in the European theater (except Iceland, where it was not used). He also stated that the formula was not necessarily the ideal one and that some compromise with shortages of material had been necessary.

In the spring of 1944, a trial was conducted at the 7th General Dispensary and the 19th Station Hospital on the use of a new louse repellent in the treatment of scabies. This preparation, made up of DDT and benzocaine, turned out to be useless as a scabicide.

BAL for arsenical intoxication.—In late 1943 and early 1944, when the intensive arsenotherapy of early syphilis was reaching its height, some 1 per cent of those being treated showed severe reactions to the arsenicals used. Information was available indicating that BAL was highly effective in the treatment of arsphenamine dermatitis. Colonel Pillsbury attempted to obtain a small supply of the preparation from the Office of the Surgeon General without success. Successful arrangements were then made locally in England to obtain ampules of BAL ointment (OX.217) from Prof. R. A. Peters, Department of Biochemistry, Oxford University. Although Colonel Pillsbury thought that BAL was proving to be of value in treating severe reactions to arsenotherapy, many factors, such as the limited supply of BAL, movements of hospitals, and treatment with penicillin instead of arsenotherapy, militated against the setting up of any conclusive test of its worth.³¹

Penicillin ointment for superficial skin infections.—Many medical units throughout the theater devised methods of using penicillin for the external treatment of superficial infections of the skin. A British proprietary preparation, Lanette Wax SX, was favored initially as an emulsion base. Later, standard U.S. Army emulsion bases proved satisfactory. Ordinary lubricating jelly and Mennen's Brushless Shave cream were also good. The primary problem was the keeping qualities of the penicillin incorporated into these bases. Here again, the experiences in the European theater were asked for by The Surgeon General, and a report was submitted.³²

Slow absorption of penicillin.—*If there had been some way of administering a large amount of penicillin so that it could have been absorbed slowly, the benefit to combat troops in the treatment of gonorrhea would have been tremendous (fig. 112).* Work was being done on the problem in the Zone of Interior. The Strategic Air Forces in England had attempted a single-injection treatment of gonorrhea with 100,000 units of penicillin, but the rate of cure had not been satisfactory. Colonel Pillsbury informed Colonel Middleton that the development of such an item was too great an undertaking for the theater at that time under combat conditions. His judgment was confirmed when considerable technical difficulties were encountered in the United States in the development of penicillin in oil.³³

After Colonel Pillsbury had an opportunity to observe firsthand the progress that was being made in the United States in developing a slowly absorbed penicillin preparation, attempts were made to produce some of the material locally in the theater using British sources of supply. When General Morgan visited the theater in February 1945, he brought samples of a successful preparation with beeswax used as a base and made up in strength of 500,000 units per cubic centimeter.

³¹ (1) Memorandum, Professional Services Division, for Chief Surgeon, ETOUSA, 28 Feb. 1944, subject: BAL Ointment (OX.217) for Arsenical Intoxication. (2) Memorandum, Professional Services Division, for Col. C. P. Rhoads, Gas Casualties Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 27 July 1944, subject: BAL (OX.217) in Treatment of Reactions to Mapharsen.

³² Letter, Col. D. M. Pillsbury, to Brig. Gen. Hugh J. Morgan, Office of the Surgeon General, U.S. Army, 8 Aug. 1944.

³³ Memorandum, Col. D. M. Pillsbury, for Col. W. S. Middleton, Chief Consultant in Medicine, Office of the Chief Surgeon, Headquarters, ETOUSA, 21 Oct. 1944, subject: Technical Data Reports.

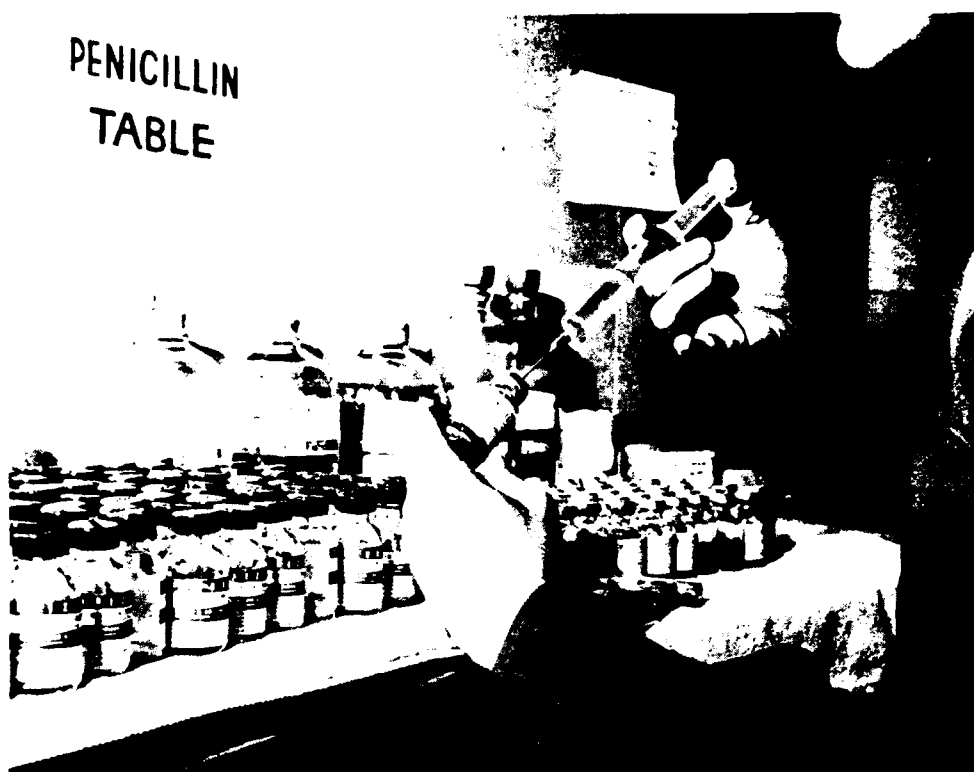


FIGURE 112.—Standard preparation of penicillin for use. Distilled water, 10 cc., is added to sealed vials containing 100,000 Oxford units of sodium penicillin.

Professional Activities

Meetings and conferences. The years of active warfare saw no letdown in the number and variety of meetings and conferences. Colonel Pillsbury continued to attend the conferences of command dermatologists held by the British Army and, at one of the conferences, presented a talk on the nomenclature of skin diseases used in the U.S. Army. The British had requested this presentation in conjunction with a contemplated revision of the nomenclature used by the British Army. Addresses were also made before the Society for the Study of Venereal Diseases; the Section of Medicine, Royal Society of Medicine; the British Association of Clinical Pathologists; and the Inter-Allied Conference on War Medicine. Maj. (later Lt. Col.) Winfred P. Killingsworth, MC, from the Office of the Surgeon, Headquarters, Third U.S. Army, through arrangements made by Colonel Pillsbury, also gave a talk on penicillin therapy of venereal diseases before a gathering of the Inter-Allied Conference on War Medicine held in London during late 1944. Colonel Pillsbury's most important address during this period was made before the International Conference on Venereal Diseases, sponsored by the U.S. Public Health Service and held at St. Louis, Mo., on 9 November 1944. While on temporary duty in the United States, he also attended and spoke briefly at the conference of medical consultants held by The Surgeon General at Ashford General Hospital, White Sulphur

Springs, W. Va., and at the meeting of service command venereal disease control officers held at St. Louis on 8 November 1944.

Writing and editing.—Colonel Pillsbury assumed editorship of the *Medical Bulletin* of the Chief Surgeon's Office, European Theater of Operations, in August 1944. It was felt that the great advances being made in many fields of military medicine in the European theater, from the standpoint of both administration and professional care, were not being adequately circulated. As editor of the bulletin, Colonel Pillsbury was specifically responsible for (1) stimulation of medical officers in all echelons in the writing of papers suitable for publication, (2) collecting and abstracting of material from various meetings, (3) editorial revision of papers, (4) submission of papers to qualified experts for review and revision, and (5) recommendation of changes in format of the bulletin in conjunction with Col. Howard W. Doan, MC, General Hawley's executive officer. Much emphasis was placed upon the many new developments in the management of battle casualties in clearing stations and evacuation hospitals.

As a contributor to the bulletin, Colonel Pillsbury with his subordinate consultant associates published papers on the proper handling and shipment of specimens for serologic examination, on a method for preventing contamination of spinal fluid, on the indications for spinal fluid examination in the management of syphilis, and on penicillin therapy in gonorrhea.

The following directives emanating from the Office of the Chief Surgeon, Headquarters, ETOUSA, were drafted by Colonel Pillsbury during this period: Circular Letter No. 31, 10 March 1944, subject: The Diagnosis and Reporting of the Venereal Diseases; Circular Letter No. 34, 6 March 1944, subject: Management of Simple Skin Diseases; Circular Letter No. 49, 30 March 1944, subject: Amendment of Circular Letter No. 22;³⁴ Circular Letter No. 86, 22 June 1944, subject: Penicillin Therapy for Early Syphilis; Circular Letter No. 103, 9 August 1944, subject: Management of Neurosyphilis; and Circular Letter No. 107, 25 August 1944, subject: Treatment of Gonorrhea and Syphilis with Penicillin.

SUMMARY IN RETROSPECT

Donald M. Pillsbury, M.D.

As has been noted elsewhere in this volume, the consultant system instituted by the Chief Surgeon, ETOUSA, was unique in the Armed Forces of the United States in 1942. The Office of the Surgeon General, U.S. Army, lacked adequate consultant representation of the various branches of clinical medicine at the beginning of the war and never achieved representation completely. In the field of dermatology, for instance, in which great disability was encountered, especially in the Southwest Pacific Area, there was no consultant representation in the Office of the Surgeon General until the war was almost over. The system

³⁴ This circular letter first authorized the use of penicillin for the treatment of gonorrhea occurring in combat troops and air crews.

adopted in the European theater was based upon the "Advisor" scheme of the Office of the Director General, Royal Army Medical Corps, and the professional representation was essentially similar.

It is the firm belief of the writer that the availability of competent consultant service in any large body of troops is essential to a high degree of professional medical service. On the other hand, the number of consultants must not be inordinate, to avoid wasting high-grade professional personnel. The representation among various branches of medicine, surgery, psychiatry, and the laboratories will vary somewhat depending upon the incidence of particular diseases and of combat casualties among the body of troops concerned. Obviously, consultants are justified only in large bodies of troops; for example, in a field army or a higher command.

Certain advantages of the consultant system may be put down, as follows:

1. Provided the consultants concerned are aware of the actual medical situation on a day-to-day basis, from adequate reports and continuous observation in the field, the origins and growth of important medical problems can be detected very promptly. An impending situation will frequently be suspected by a competent consultant long before it appears in official reports through channels in the form of significant disability rates.

2. Provided the distances of travel do not make it impractical, regular consultant visits to medical installations of all types make possible personal consultation on large numbers of patients in the light of the latest information and the broader experience that a competent consultant may be presumed to have.

3. A consultant group furnishes a means for exchange of technical information through special channels on an informal basis, and this is very useful. However, it must be done with the greatest care, in order not to infringe on the administrative functions and responsibilities of commanders.

4. The consultant is in a position to alert the surgeon of a command to the need for the preparation and distribution of technical bulletins or, in some instances, a need for command directives, particularly in the field of preventive medicine.

5. A respected and acceptable consultant can be of considerable assistance in the maintenance of morale and effectiveness among medical officers, particularly those who have been long away from home or who are working in isolated stations. The reverse effect may, however, result if the consultant is ill informed, brusque, or personally objectionable.

6. One of the most useful functions of a consultant is the evaluation of the special and general professional competence of medical officer personnel. Specialty numbers are frequently an uncertain guide in respect to a medical officer's true effectiveness; to evaluate an officer properly, personal contact with him and observation of his work are essential. In such evaluations, however, the consultant must exercise the utmost discretion and remain aware of the responsibilities of command and of personnel officers in this regard.

In an atmosphere of mutual respect, however, transfers and other changes essential to good professional care in any unit can ordinarily be effected without difficulty or friction.

It should be pointed out that the relatively static conditions obtaining in the European theater in the years 1942 to mid-1944 (with the exception of the Army Air Forces) permitted the gradual absorption and indoctrination of consultants. It seems doubtful that such a condition will exist in any future war, and planning for such an organization must be made beforehand if it is ever to be effective.

Certain attributes that characterize an effective medical officer apply equally to consultants, but there are additional stresses and responsibilities that require a broader professional background and a high degree of diplomacy. These may be summarized as follows:

1. The professional competence of the consultant must be of a high order; he cannot depend too greatly upon rank and military customs to gain the true professional respect of his fellow medical officers, however junior. A consultant who too consistently gets beyond his depth professionally will soon become ineffective.

2. In a large theater of operations, it is impossible, however, for a chief consultant to function effectively at too low a rank, particularly in dealing with commanding officers of hospitals and senior officers in other command and staff positions. The absence of any approved table of organization for consultants in ETOUSA was a source of some difficulty in this respect but was overcome to a great extent by the continuous staunch support and backing of the Chief Surgeon.

3. A consultant who is not well indoctrinated in Army administrative processes will have difficulty in attaining full effectiveness, regardless of his professional competence, and may encounter repeated official or personal difficulty because of lack of knowledge of simple rules of procedure. The experienced medical officer develops an acute sense of when to proceed through channels and when to cut across, when to be official and when to be personal. This requires many years of experience to realize fully, but the rudiments of the game may be learned in a few months of study.

4. The most useful consultant is one with a real breadth of professional vision and willingness. Complete restriction to a narrow specialty is ordinarily impossible because the consultant is regarded as a representative of the surgeon and therefore reasonably cognizant of the nature and scope of the chief problems being encountered. He may find himself of little usefulness at times if he refuses to function outside of some very narrow branch of medicine and surgery. Moreover, such an attitude may be destructive to the total effort if it leads to competition among specialists for increasing recognition of their respective activities, without regard for the relative contribution that each may make.

5. Under some circumstances, a medical officer in particular fields must serve both as a consultant and as an active practitioner in any or all types

of medical installations, ranging from a general hospital to a battalion aid station. Under such circumstances, it is of vital importance that this dual responsibility be recognized by the commanding officer of the unit concerned.

Although the preceding comments are my considered opinions, they could, nonetheless, be illustrated by numerous incidents and personalities which constitute the historical record.

Part III. Senior Consultant in Neuropsychiatry ³⁵

ARRIVAL AND EVALUATION

The Senior Consultant in Neuropsychiatry, ETOUSA, Col. Lloyd J. Thompson, MC (fig. 113), reported for duty on 25 August 1942 to the Office of the Chief Surgeon, Headquarters, ETOUSA, then located at Cheltenham, England. He was placed under the overall direction of Colonel Middleton, Chief Consultant in Medicine, ETOUSA, in keeping with the organizational plan of General Hawley's office and the precedent established in World War I. Colonel Thompson was the second consultant in neuropsychiatry to be appointed by The Surgeon General during World War II.

Colonel Thompson soon realized that he would be engaged in much staff work and activities of an operational and planning nature. At the time of his arrival, the functions of a consultant were as yet unspecified in War Department doctrine or directives. It was the general understanding that the primary duty of a consultant was to coordinate and supervise effectively the strictly professional aspects of problems involved in providing hospital care to patients.³⁶ Colonel Thompson had to initiate the necessary steps to establish special facilities for the care of neuropsychiatric patients, evacuation plans and policies with respect to them, and specialized training and educational activities for those entrusted with their care. In conjunction with the supply service, he had to insure that adequate supplies and equipment peculiar to treatment of neuropsychiatric cases were always available. The problems in neuropsychiatry, insofar as Colonel Thompson was concerned, were obviously those concerned with the development and management of a broad mental health program.

Colonel Thompson found that there was a definite need for current, reliable data to serve as a basis for his plans and a need for tangible evidence to bolster his arguments for their support in discussions with those persons in a position to approve or disapprove them.

The British, who by this time had had nearly 3 years of experience in the war, were very cooperative in providing useful data, information, and counsel.

³⁵ (1) The narrative for this section was compiled by Maj. James K. Arima, MSC, The Historical Unit, U.S. Army Medical Service, in collaboration with Lloyd J. Thompson, M.D., formerly Senior Consultant in Neuropsychiatry, ETOUSA. Dr. Thompson contributed the summary in retrospect in May 1956. (2) Unless otherwise noted, this section is based on the following documents prepared by Colonel Thompson: Annual Reports of Senior Consultant in Neuropsychiatry, ETOUSA, for 1942, 1943, 1944, and 1945 (first half); the official diary of Colonel Thompson; and preliminary manuscripts submitted by Colonel Thompson to The Surgeon General for the history of neuropsychiatry in World War II.

³⁶ Letters, The Surgeon General, to Commanding General, Services of Supply, 28 May 1942 and 23 June 1942, subject: Coordination and Supervision of Medical Service in Station Hospitals.

FIGURE 113.—Consultants in medicine, European theater. (Right, top) Col. Lloyd J. Thompson, MC, Senior Consultant in Neuropsychiatry, Office of the Chief Surgeon, ETOUSA; (left, bottom) Col. Ernest H. Parsons, MC, Acting Senior Consultant in Neuropsychiatry, Office of the Chief Surgeon, ETOUSA; (right, bottom) Lt. Col. Jackson M. Thomas, MC, Chief, School of Military Neuropsychiatrists, ETOUSA.



During the first month of his tenure, Colonel Thompson spent considerable time studying the neuropsychiatry organization and experiences of the Royal Army Medical Corps and the Royal Canadian Medical Corps. Brigadier J. R. Rees, Consultant in Psychiatry to the British Army at home, and Col. F. H. van Nostrand, Consultant in Psychiatry to the Canadian Army, were extremely helpful. In company with these officers, Colonel Thompson visited many garrisons, training activities, and hospitals to observe firsthand the practice of psychiatry in the British forces. He also attended meetings and conferences of their psychiatric staffs and was later to become a regular participant in meetings of their command consultants. In order to share this

newly found knowledge with those who could most profit by it, Colonel Thompson sent special reports to The Surgeon General on the organization and operations of the British psychiatric services. In particular, Colonel Thompson was impressed by the efforts of the British to venture beyond the limits of hospital practice and to emphasize prevention rather than cure.

The British, on the other hand, revealed that they had found much of value in the U.S. Army Medical Department history of neuropsychiatry in World War I,³⁷ particularly in coping with their own early problems concerning neuropsychiatric activities in World War II. They referred to parts of the work as a "bible." Colonel Thompson also found it useful as a reference and a guide in forming policies and organizing units and services.

Current analytical and statistical data for U.S. troops, however, were lacking. It was necessary to create, in conjunction with the Medical Records Division, Office of the Chief Surgeon, Headquarters, ETOUSA, special forms for reporting neuropsychiatric cases. One form was devised for the use of psychiatrists in writing up diagnoses and dispositions for submission to the Office of the Chief Surgeon. Another form was to be made out by both the medical officer and the individual's commanding officer on all patients referred for psychiatric consultation or treatment. It provided background history on such matters as convulsive disorders and head injuries and provided special information desired on flying personnel.

The North Ireland Base Section was a closely knit, relatively independent command. It had an early start in the European theater. Here were marshaled the forces necessary for the invasion of Africa in late 1942. Capt. (later Lt. Col.) Frederick R. Hanson, MC, working as neuropsychiatric consultant to U.S. Army forces in that command and part-time consultant to British forces, had coordinated the neuropsychiatric services in that area, established outpatient and consultation services to care for neuropsychiatric problems outside of hospitals, and was maintaining close liaison with ground forces in the screening, assignment, and classification of personnel in combat units and replacement centers. Need for similar services would doubtless arise in other parts of the theater. With the invasion of Africa on 8 November 1942, the exodus of troops from Northern Ireland put an end to most of these particular activities.

Hospitals and personnel in 1942.—At the time of Colonel Thompson's arrival in the theater, there were 3 general hospitals—2 in England and 1 in Northern Ireland—and 2 station hospitals. All the psychiatric wards were filled to capacity. Each hospital had one qualified neuropsychiatrist on the staff, and some had one or two assistants with practically no previous experience or training in the specialty. In addition, four partly qualified medical officers were attending the British School of Neuropsychiatry. There was also one recently assigned neuropsychiatrist at Headquarters, Eighth Air Force, Capt.

³⁷ The Medical Department of the United States Army in the World War. Neuropsychiatry. Washington: U.S. Government Printing Office, 1929, vol. X.

(later Lt. Col.) Donald W. Hastings, MC,³⁸ and one at the headquarters of the North Ireland Base Section, Captain Hanson. Each hospital had one ward for psychiatry, but in only one was there a closed ward, a mere makeshift. It was necessary to send nearly all disturbed psychotic patients to British mental hospitals. There were a few nurses who had had some psychiatric training, but none of the wardmen had had any previous experience. Plans had already been furnished British contractors who were building additional hospitals for the U.S. Army; but for closed-ward neuropsychiatric patients, these plans provided for only two small cell-like rooms, designed with only one small, barred window near the ceiling. These rooms were inconveniently situated with respect to latrine and other ward facilities and the efficient use of ward attendants.

In September 1942, the U.S. Army negotiated for the use of the Exeter City Mental Hospital in England. The hospital was built in 1885, but, in spite of its age, it appeared that it would prove satisfactory. On 23 December 1942, the 110th Station Hospital moved into the Exeter Hospital. It was planned to relieve the 110th Station Hospital with a neuropsychiatric hospital unit that was expected shortly from the United States.

Upon review of the situation, Colonel Thompson recommended that all general hospitals have at least two separate psychiatric wards, one open and the other closed. He supervised preparation of plans for the conversion of one general ward to a mental ward in each general hospital. He was assisted in this project by a hospital architect in the Hospitalization Division, Office of the Chief Surgeon, Headquarters, ETOUSA. Colonel Thompson also submitted recommendations for the establishment of a neuroses center where treatment conducive to return of patients to duty could be rendered in an atmosphere removed from the influence of sick, wounded, or psychotic patients.

By the end of 1942, two other general hospitals had been established, and the 5th General Hospital had been transferred from Ireland to England.

Division psychiatrists.—During a visit to the 1st Infantry Division in September 1942, Colonel Thompson found that a psychiatrist had been assigned to the division surgeon's office a year and a half before but that the most recent tables of organization no longer provided for a division psychiatrist. Yet there was evidence of the excellent work done by this psychiatrist in the 1st Division; plans had even been worked out for his functions during combat. This situation brought about much discussion by Colonel Thompson with other medical and line officers on the need for a division psychiatrist. In World War I, a similar need had been discovered, and the assignment of one psychiatrist to each division was authorized in early 1918. Although the type of warfare had changed, there was every indication that a division psychiatrist would be very valuable throughout the long training period and that his value in combat as well, especially in the diagnosis and treatment of fatigue, concussion, and neurosis cases, seemed unquestionable. Accordingly, Colonel Thompson initiated a

³⁸ Captain Hastings was later replaced by Capt. (later Maj.) Douglas D. Bond, MC, who served until the end of the war.

recommendation to The Surgeon General for reestablishment of the position of division psychiatrist.³⁹ It was not until considerably later, however, that it was authorized (p. 344).

This was the first time that Colonel Thompson submitted recommendations for a change in Army organization, but it was not the last. He was to find that one of his key functions would be the submitting of recommendations for the establishment of new tables of organization and changes in existing tables. Furthermore, the impetus for submitting such recommendations was, eventually, not only to originate from the consultant himself but from other sources as well.

Summary.—As Colonel Thompson became thoroughly familiar with the prevailing situation, it was clear that the first and most logical step would be the establishment of special facilities for the handling of seriously disturbed, psychotic patients. A more difficult but equally essential project was the setting up of special wards in all fixed hospitals for both open- and closed-ward care of neuropsychiatric patients. The most important and apparently insurmountable task was that of providing the framework throughout all elements of the theater to prevent, recognize early, and alleviate the more commonly occurring neurotic and psychopathic states. In spite of the fact that the experiences of World War I were fully documented, that the early British experience in World War II was readily available, and that a working organization had been initiated in Northern Ireland, it was an inescapable conclusion that the European theater as a whole would be making a *completely fresh start*.

FROM BUILDUP AND INVASION TO VICTORY

Key Personnel

As the theater expanded and his activities became more diversified, Colonel Thompson found that he could not give all projects the amount of personal attention they required, particularly special, long-term projects of such a nature that they could not be established by directive alone and then carried through solely on the initiative of medical officers in subordinate echelons. In some cases, the projects required close coordination and supervision by one centralized authority. In others, one well-qualified individual could carry on the project better than many others on a part-time basis. Colonel Thompson found he had to rely on a few unusually well qualified and dependable neuropsychiatrists to take the onus of carrying through many such projects. As special requirements arose these few officers were called upon time and again and were often shifted from one assignment to another as dictated by the situation.

With few exceptions, these officers conducted their special project while still assigned to a hospital unit. In some cases, it was their primary duty; in others, it was an additional duty; and, in a few cases, the officers were placed

³⁹ Letter, Col. P. R. Hawley, MC, Chief Surgeon, ETOUSA, to The Surgeon General, U.S. Army, 3 Nov. 1942.

on temporary duty with the particular activity they were supporting. In only two instances were officers placed on duty with the theater headquarters to augment the professional staff. Maj. (later Lt. Col.) Paul V. Lemkau, MC, filled in for Colonel Thompson during the latter's temporary duty to the United States in December 1944 and January 1945. Maj. (later Lt. Col.) Douglas M. Kelley, MC, in February 1945, was assigned for duty with Colonel Thompson as the consultant in clinical psychology.

In 1942, Colonel Thompson, having in mind one who could be trained in both neurology and psychiatry, had requested an additional officer to act as coordinator of hospital neuropsychiatric activities. Some months later, an officer arrived in the European theater who, although well trained in neurology, did not have the other necessary requisites for the position. Any further overtures to obtain an assistant were not favorably considered. Colonel Thompson also suggested the appointment of full-time neuropsychiatric consultants in base sections to serve in a capacity similar to base section medical and surgical consultants. This recommendation was also not accepted.⁴⁰

Hospitalization and Evacuation

The policy of providing inpatient, outpatient, rehabilitation, and consultation neuropsychiatric services in all station and general hospitals was adopted early. It was a policy designed to establish closer rapport between psychiatrists in hospitals and the general duty medical officer in the unit, thus opening the door for emphasis on preventive aspects of psychiatry. Since the combat elements did not have neuropsychiatrists as a part of their organization at that time, this policy served also to take the practice of neuropsychiatry into the environs where neuropsychiatric problems originated. For Colonel Thompson, the translation of this policy into practice involved frequent visits to hospitals to make sure that qualified personnel were assigned to neuropsychiatric positions and that everything was being done, within the means available, to provide adequate facilities, equipment, and service. The most fruitful results, however, could be obtained only through extensive educational and training activities.

Specialized hospitals

The creation of hospitals solely for neuropsychiatric patients was a step taken with considerable reluctance. It was considered extremely important to keep neuropsychiatry intimately related to and part of general medicine. However, the general hospitals and larger station hospitals did not have the facilities to hold and care for psychotic patients.

Moreover, as time went on, there was ever-increasing evidence that, in the care of neuropsychiatric patients who actually required hospitalization, specialized facilities would have certain distinct advantages over nonspecialized hospitals. This was particularly true of nonpsychotic patients for whom there

⁴⁰ Letter, Lloyd J. Thompson, M.D., to Col. John Boyd Coates, Jr., MC., 1 May 1956.

was a good prognosis for recovery and return to useful duty. It was apparent that a total atmosphere capable of inducing a desire to return to duty had to be created in order to salvage patients in this category. It was further apparent that, in order to create such an atmosphere, the patient capable of rehabilitation had to be segregated from psychotic and from nonneuropsychiatric patients as well. General Hawley, the theater Chief Surgeon, had acknowledged early the need for these facilities and maintained continuing interest in their establishment and operations.

36th Station Hospital. This was the first neuropsychiatric hospital to be established in ETOUSA. When it arrived at Liverpool on 13 January 1943, the situation was unique in that this was the only neuropsychiatric hospital in the theater until much later in the war when units from the Mediterranean theater were transferred to ETOUSA. The 36th Station Hospital was the special neuropsychiatric unit that had been expected (p. 321). It was commanded by Lt. Col. (later Col.) Ernest H. Parsons, MC (fig. 113), who was an experienced neuropsychiatrist and who had been a Regular Army officer for 12 years.

The hospital unit had been well trained in the Zone of Interior and was ready to function efficiently upon arrival. With a minimum of staging, the hospital replaced the 110th Station Hospital at Exeter. Ten days after its arrival in the theater, on 23 January 1943, the 36th Station Hospital (fig. 114), admitted its first patient, although the directive announcing its opening and functions was not published until 6 days later.⁴¹ The unit was designated as the hospital of choice for definitive treatment of neuropsychiatric patients. It received patients only from other station and general hospitals.

An obvious problem was presented, however, in that this installation, with a rated 384-bed capacity, would not be able to meet the needs of the theater. Colonel Thompson made a detailed study of prevailing psychiatric rates and those of World War I. The solution appeared to lie in the establishment of a separate center for neurotic patients. Colonel Thompson reasoned that neurotics who did not respond to treatment in a short time should be isolated from the physically ill before symptoms became too fixed. A center for neurotics required ordinary facilities for hospital care and treatment, but the unique part and heart of the center would be a training camp where patients could live a normal military life with drill, physical training, and the like. Colonel Thompson recommended that a station hospital at Moreton Hampstead be used for this purpose. He further recommended that, to save personnel, the neuroses center and the 36th Station Hospital be combined into one unit with a single overhead.⁴²

General Hawley studied the recommendations carefully but saw objections to the hospital at Moreton Hampstead. There was some question whether it

⁴¹ Circular Letter No. 20, Office of the Chief Surgeon, Headquarters, ETOUSA, 29 Jan. 1943, subject: Hospitalization of Neuropsychiatric Patients.

⁴² Letter, Lt. Col. E. J. Thompson to Col. J. C. Kimbrough, Director, Professional Services, Office of the Chief Surgeon, Headquarters, ETOUSA, 14 Feb. 1943, subject: Estimate of Needs for Hospitalization for Neuropsychiatric Disabilities in E.T.O.



FIGURE 114. 36th Station Hospital, Exeter, England.

had sufficient facilities for expansion, particularly sewers and powerlines. Also, this installation would be 18 miles away from the 36th Station Hospital, and General Hawley doubted that two hospitals that far apart could be operated efficiently under a single administration. He concurred in the plan for combined facilities but suggested that another 250-bed hospital be used for the neuroses section.

Colonel Thompson had no alternative but to go to the 36th Station Hospital and work out plans for the establishment of a training adjunct to that hospital. By mid-March, a training company had been activated. An Air Corps captain, who was a convalescent patient, was designated as its commanding officer. Quarters were arranged and operated as barracks. A rigid, daily schedule of military activities was initiated. The program also included work details, occupational therapy, group discussions, and full information and education activities. Without too much difficulty, an atmosphere of return to duty was created (fig. 115). The return-to-duty rate for nonpsychotic cases soon rose to over 50 percent.

In April 1943, Colonel Thompson submitted revised estimates, projected to January 1944, of theater needs for neuropsychiatric beds. These estimates emphasized the need for a larger facility for more serious psychotic cases and the immediate need for a special rehabilitation hospital for nonpsychotic cases.⁴³ At the 30 June 1943 meeting of the Medical Consultants Subcommittee,

⁴³ Letter, Lt. Col. L. J. Thompson to Col. J. C. Kimbrough, Director of Professional Services, Office of the Chief Surgeon, Headquarters, ETOUSA, 30 Apr. 1943, subject: Future Needs for Hospitalization of Neuropsychiatric Patients.



FIGURE 115. Interior of 36th Station Hospital. A. Wards with atmosphere of military barracks. B. Patients receiving military instruction in identification of aircraft.



FIGURE 116. Closed ward at 36th Station Hospital.

Colonel Thompson reported to Colonel Middleton that the census at the 36th Station Hospital had remained over 300 for the past few weeks. Owing to a great variety of patients, ranging from acutely disturbed psychotics to mild *neurotics* and *passive homosexuals*, there had to be several subdivisions within the hospital. As at any specialized facility, the dispersion factor was high, and at any given time one subdivision could be overcrowded while another had several vacant beds. Colonel Thompson emphasized the point that it could never be hoped to equal by actual occupancy the estimated bed capacity of 384. Under the circumstances, the training-company barracks were being encroached upon and the work of the training company, which was so important in getting men back to duty, was being hampered. There was an increasing number of men being sent back to duty, but, since some were being sent out prematurely to make room for new patients, there remained the possibility of relapse in some cases. Colonel Thompson emphasized again the urgent need for a *neuroses* unit. For the time being, as the need arose, more closed wards could be provided at the 36th Station Hospital (fig. 116), for psychotic patients if such a separate *neuroses* unit could be established elsewhere.

Colonel Middleton brought Colonel Thompson's statements to the attention of General Hawley. Eventually, General Hawley and Col. Charles B. Spruit, MC, Deputy Chief Surgeon, ETOUSA, agreed on the hospital site at Barnstable to receive the overflow of neuropsychiatric patients. It was not until late September, however, that Colonel Spruit discussed with Colonel Thompson the possibility of using the hospital at Barnstable as a *neuroses* center. Colonel Spruit pointed out that, although it was intended in the future to use this hospital for neurotic patients, at the moment it had to take all types of patients and be used to provide medical care for the Assault Training Center. He

directed that inquiries be made into the possibility of obtaining land in the environs of the hospital. It was found that ground space for outdoor military and athletic activities was entirely inadequate and additional ground could not be obtained.

Neuroses center for treatment and rehabilitation

General Hawley had always maintained an active personal interest in the establishment of the neuroses center, and, on 2 October 1943, Colonel Thompson conferred with him on the matter. Shortly thereafter, it was suggested to Colonel Thompson that a station hospital site at Shugborough Park be considered for his neuroses center. On 23 October 1943, Colonel Thompson inspected the installation at Shugborough Park and found that there were almost 100 acres of land that could be used for the purpose intended. On 27 October 1943, he visited the Southern Base Section and conferred with the base medical consultant and the commanding officer of the 36th Station Hospital regarding personnel and other details, and, on 8 November 1943, he conferred with chiefs of various divisions in General Hawley's office who would be concerned with the opening of the hospital.

The problems did not end with finding a site, however. The 4th Convalescent Hospital, which was originally designated to be converted into a neuropsychiatric unit and operate the center, was claimed for assignment to the First U.S. Army.

312th Station Hospital.—This station hospital, a nonspecialized unit which had recently arrived from the Zone of Interior, was then selected to operate the facility at Shugborough Park. Upon recommendations initiated by Colonel Thompson, the Southern Base Section transferred key individuals, including Colonel Parsons, from the 36th Station Hospital to the 312th Station Hospital. There was an adjustment of other personnel so that, eventually, two neuropsychiatric hospitals were manned in the theater without bringing in additional personnel from the United States. The 312th Station Hospital was officially opened on 1 December 1943, and the first patient was admitted on 3 December 1943, nearly 10 months from the time that the establishment of such an installation was first recommended.

The plan of function that had been evolved at the 36th Station Hospital was adopted. After initial workup of each case, with a decision as to type of treatment, the patient spent from 10 days to 2 weeks in the treatment section. Following this, he was transferred to the training or rehabilitation wing, such transfer being the needed step between hospital care and duty. Officers of the training section were, initially, line officers who had been wounded in action in the North African theater. The return-to-duty rate averaged 80 percent, which was remarkable since the patients represented failures received from other hospitals.⁴⁴ The 312th Station Hospital continued to maintain this record of performance throughout the subsequent months of its operations on the Continent.

⁴⁴ Thompson, L. J.: Neuropsychiatry in the European Theater of Operations. *New Eng. J. Med.* 235: 7-11, 1946.

Holding center for psychoses

96th General Hospital.—To fill the need defined in April 1943 (p. 325) for a larger facility for the care of more serious psychotic patients, a site near Malvern was chosen in August 1943, and the facility was opened by the 56th General Hospital in November 1943; subsequently, in January 1944, it was operated by the 96th General Hospital. Of particular significance was the fact that this hospital was organized according to T/O&E 8-550S (Table of Organization and Equipment) that was proposed by the European theater for a neuropsychiatric general hospital and approved by the War Department. As with the 312th Station Hospital, however, the 96th General Hospital, a nonspecialized general hospital unit arriving from the Zone of Interior, had to be transformed into a specialized neuropsychiatric unit by exchanging qualified neuropsychiatric personnel available in the theater for nonneuropsychiatric medical officers arriving with the unit.

The primary mission of this hospital was that of a holding unit. It was ultimately responsible for the care and disposition of nearly all psychotic patients in the theater. The 96th General Hospital was also responsible for the disposition of neuropsychiatric patients determined by other hospitals to be incapable of rehabilitation for duty in the theater. A need for such a unit was well vindicated following the invasion of the Continent. For example, in October 1944, the census of the 96th General Hospital was 1,206 with over half of these patients awaiting evacuation to the Zone of Interior.

Transit hospitals

Forces that invaded the Continent on D-day were provided medical support in the United Kingdom in two phases (fig. 117). First, boat- and air-evacuated casualties were received at transit hospitals located along the southern shores or at airfields. Then all casualties were transported by hospital train or other conveyance to general hospitals in the United Kingdom. In the early days of the invasion, all casualties, including neuropsychiatric, were completely intermingled upon arrival at transit hospitals, and the primary considerations governing their transfer to other hospitals were convenience in movement and availability of beds.

It was impossible, at this time, to sort patients on the Continent and evacuate them to designated transit hospitals for further evacuation to a specialized treatment center, as had been recommended. Triage of neuropsychiatric patients at transit hospitals for transportation to specialized treatment centers also was recommended but could not be done. Neuropsychiatric patients were surprisingly low in number and their arrival at transit hospitals so haphazard and sporadic that they could not be grouped together for a single shipment. The heavy load upon limited transportation facilities and the necessity of adhering to straightforward transportation schemes did not permit transfer of small groups of patients from one hospital to another at crosscurrents to the general flow of traffic. This situation continued for neuropsychiatric casualties until well into August 1944.



FIGURE 117. Evacuation in United Kingdom in support of Normandy invasion. A. Ambulances preparing to accept casualties from docked LST, Weymouth, England, 10 June 1944. B. Ambulatory patients being loaded into bus at Weymouth, England, 10 June 1944.



FIGURE 117. Continued. C. Hospital train being loaded at Sherborne, England, 15 June 1944. D. Evacuation aircraft arriving at Membury Field (near Swindon), 18 June 1944.

Troublesome consequences of this largely unavoidable situation were soon to appear. The replacement depot reported that, between D-day and 2 July 1944, more than 100 neuropsychiatric patients had been sent back to duty too soon. About half of them had been on neuropsychiatric services in general hospitals, but apparently the psychiatrists had been too enthusiastic in applying their indoctrination of sending patients back to duty as soon as possible. The remaining half were patients who had been initially admitted for a primary diagnosis other than neuropsychiatric but whose neuropsychiatric symptoms appeared at the replacement center. Colonel Thompson had to visit as many general hospitals as quickly as possible in order to analyze and correct the situation on the spot. Colonel Parsons was also called upon to help.

The general situation grew worse as the tactical situation grew more fluid on the Continent. By 1-15 August, the Third U.S. Army had joined the offensive, and the first fixed hospitals had begun to establish themselves in Normandy. Before most of these hospitals could begin operating efficiently, they were far outdistanced by the rapidly expanding front. Psychiatric casualties evacuated from the field armies were being shunted from hospital to hospital with no treatment except sedation. Evacuation policies that limited holding of patients to not more than 10 days prohibited institution of any worthwhile psychotherapy. The First U.S. Army had countered loss of personnel by establishing procedures, on 10 July 1944, whereby neuropsychiatric casualties could be reassigned to limited duty within the army. Heretofore, a casualty either had to be returned to duty with his unit or evacuated out of the army. The Third U.S. Army established procedures for reassignment of casualties to limited duty within the army similar to those established by the First U.S. Army. This policy relieved the situation somewhat but was by no means an answer to the greater problem of what to do with those casualties which the armies themselves could not handle.

Advanced neuropsychiatric units

In World War I, the American Expeditionary Forces had found it necessary to establish neuropsychiatric units immediately to the rear of the combat areas. Having foreseen the recurrence of such a situation, Colonel Thompson had recommended as early as January 1944 that a unit be equipped and trained to operate as an advanced unit for receiving neuropsychiatric casualties from a field army. At various times prior to the invasion, he had recommended that personnel of the 36th Station Hospital, and later the 312th Station Hospital, be trained and employed for such a mission.⁴⁵

In July 1944, Colonel Thompson held a conference attended by the Commanding Officer, 312th Station Hospital, the Deputy Chief Surgeon, ETOUSA, the Chief, Planning Branch and the Chief, Training Branch,

⁴⁵ (1) Letter, Lt. Col. L. J. Thompson to Col. J. C. Kimbrough, Director, Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA, 26 Apr. 1943, subject: Psychiatric Teams for Service During Combat. (2) Letter, Senior Consultant in Neuropsychiatry, ETOUSA, to Chief Surgeon, ETOUSA, 31 Dec. 1943, subject: Psychiatric Services in the U.S. Army in NATOUSA. (3) Letter, Col. L. J. Thompson to Col. Wm. S. Middleton, Chief Consultant in Medicine, ETOUSA, 22 Jan. 1944, subject: Psychiatric Report for Medical Subcommittee.

Operations Division, Office of the Chief Surgeon, Headquarters, ETOUSA. Colonel Thompson informed the conferees that, from D-day to D-plus-34, 2,012 neuropsychiatric casualties, excluding those with secondary neuropsychiatric conditions, had been evacuated to the United Kingdom. He calculated that a hospital located just back of the First U.S. Army would receive some 400 patients weekly. With a 3-week schedule of treatment, 1,200 beds would be necessary. But such a hospital could return to duty nearly 90 percent of the patients admitted—half of them back to combat—thus saving considerable evacuation to the United Kingdom. In view of these considerations, Colonel Thompson suggested that a 1,000-bed general hospital would adequately cover personnel needs for the establishment of such a hospital. The conferees evolved a plan to organize this special neuropsychiatric unit.

This plan was dubbed Colonel Thompson's "triangular plan" by Colonel Middleton because it involved three hospitals. It consisted of taking a general hospital arriving from the Zone of Interior in August 1944 and designating it a neuropsychiatric hospital, filling it with trained personnel from the 312th Station Hospital, bolstering the remnants of the 312th Station Hospital with trained personnel from the 36th Station Hospital, and leaving a nonspecialized station hospital (the 36th) with the residue of personnel. It was further planned that the general hospital unit would start staging 1 September 1944, move to ADSEC (Advance Section), Communications Zone, on 21 September, and commence to function on 1 October 1944. The location was to depend on the situation, but it was agreed that it should be well forward and easily accessible from army evacuation points. The scheme was duly presented to Colonel Kimbrough in a memorandum dated 19 July 1944 and its approval announced by Colonel Middleton at the next meeting of the Chief Surgeon's Consultant Committee. The 130th General Hospital was earmarked for this purpose.

130th General Hospital.—The plan progressed well up to the point where the 130th General Hospital arrived on the Continent on 4 September 1944 and a choice location had been designated for it at Ciney, Belgium (fig. 118). A month later, 5 October 1944, Colonel Thompson was obliged to go to Operations Division of General Hawley's office and report that the hospital was not yet able to operate and that the situation was becoming urgent. The equipment for the hospital had not arrived.

On 30 October and 1 November 1944, Colonel Thompson again conferred with Operations Division. While discussing admission and disposition policies pertaining to the 130th General Hospital with the chiefs of the Evacuation Division and Operations Division (chart 3), Colonel Thompson was chagrined to learn that there was still some question as to how this hospital would function. However, he did learn, on 2 November 1944 from the Supply Division of General Hawley's office, that the equipment had been located on 1 November, was loaded on trucks, and was on the way to the hospital.

While Colonel Thompson was at the hospital on 6 November 1944, the first truckload of supplies arrived. That very evening, a staff meeting was



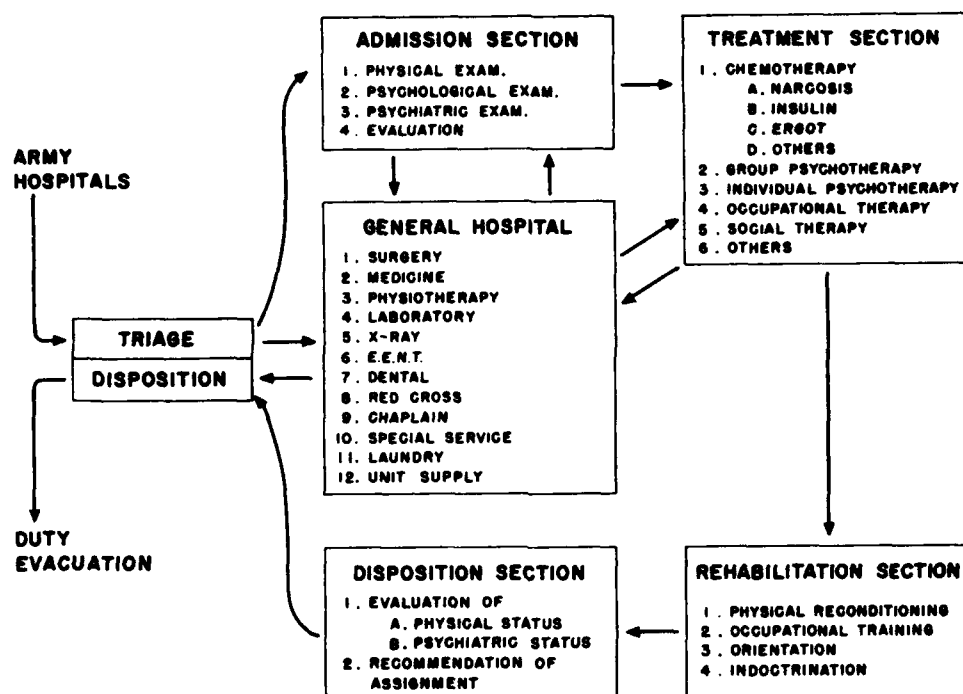
FIGURE 118. 130th General Hospital, Ciney, Belgium.

held, and problems incident to beginning operations were discussed. It was learned that the commanding officer had already agreed with Headquarters, ADSEC, Communications Zone, to use the main hospital building for general hospital and station hospital purposes (fig. 119). The psychiatric service was to be in tents, and in prefabricated buildings previously erected by the Germans (fig. 120). The training company was to be located at a chateau about a mile and a half from the hospital proper (fig. 121).

On 7 November 1944, Colonel Thompson inspected the facilities and then attended a meeting at Headquarters, ADSEC, where all commanding officers of hospitals in the vicinity were in attendance. Problems in the handling of neuropsychiatric casualties were discussed with them and it was evident that many of these problems would be solved upon opening of the 130th General Hospital. Later the same day, plans for evacuation to and from the 130th General Hospital were completed with the Deputy Chief Surgeon, ETOUSA, and Chief, Evacuation Division, Office of the Chief Surgeon, Headquarters, ETOUSA. A draft of the directive announcing these plans was drawn up.

On 17 November, the hospital was opened and the first patients admitted. A week later, the hospital was receiving medical and surgical patients but very few neuropsychiatric patients (fig. 122). Colonel Thompson brought this fact up at the Chief Surgeon's Consultant Committee meeting of 24 November 1944. Although realizing the necessity for the present arrangement, he expressed the hope that Communications Zone neuropsychiatric patients would soon be able to get suitable treatment at the 130th General Hospital.

CHART 3.—Flow chart of patients at 130th General Hospital from admission to disposition



The Deputy Chief Surgeon, Col. Liston, replied:

We certainly hope you can. I speak for all of us. These 14 hospitals in UK are reasonably up to T/O strength. I might mention that these hospitals are those supposed to have arrived here in September and operating. For reasons outside our control we don't have them. If we did have them, certainly the 130th could operate in the manner we intended it should operate from its inception. The problem is finding enough beds for the patients we have. As soon as possible, I hope that we will be able to isolate this hospital for what you want to use.⁴⁶

Before the situation could be amended, the Germans struck in their winter offensive of 1944, known as the Battle of the Bulge. The hospital was engulfed by advancing German forces. Most of the patients and personnel were evacuated, but the commanding officer and a few volunteers remained behind to care for nontransportable cases.

According to an account given Colonel Thompson by Colonel Parsons, some German officers had come to the door of the hospital a few days before Christmas. They stated that the hospital was surrounded and that the Germans expected the commanding officer to take care of German casualties that might be sent there. No German officers were assigned to take over the hospital, and Colonel Parsons did the best he could and did receive several German casualties. On or about 27 or 28 December 1944, while sitting in his office, Colonel Parsons looked at his telephone and decided to see if it was still connected. To his surprise, he was able to get through to some head-

⁴⁶ Minutes of meeting, Chief Surgeon's Consultant Committee, 24 Nov. 1944.



FIGURE 119. Medical ward, main hospital building, 130th General Hospital.

quarters in Liège and was told to sit tight because Allied troops would soon be coming back through that area.⁴⁷

Shortly thereafter, U.S. troops regained the area, and the hospital acted as a field hospital and evacuation hospital for these troops mounting the counteroffensive.

On 6 and 7 February 1945, Colonel Thompson again inspected this hospital and found that it was acting as a station hospital for the 11th Replacement Depot, Headquarters, ADSEC, and nearby Air Force installations. The census was 1,242 patients, of which only 119 were neuropsychiatric. On the afternoon of 7 February, the commanding officer of the hospital and Colonel Thompson held a conference with Colonel Liston and the Chief, Evacuation Division, Office of the Chief Surgeon, Headquarters, ETOUSA. The desire to return the hospital to its primary function seemed to be well understood, and cooperation toward this end was promised. But two weeks later, other hospitals in close proximity to the 130th General Hospital were receiving many more neuropsychiatric patients than the 130th General Hospital. On 18 March, a conference was held with the chief of the Evacuation Division on this matter. Although he was not very optimistic about the use of this specialized neuropsychiatric hospital, owing to transportation difficulties, he agreed to issue

⁴⁷ See footnote 40, p. 323.

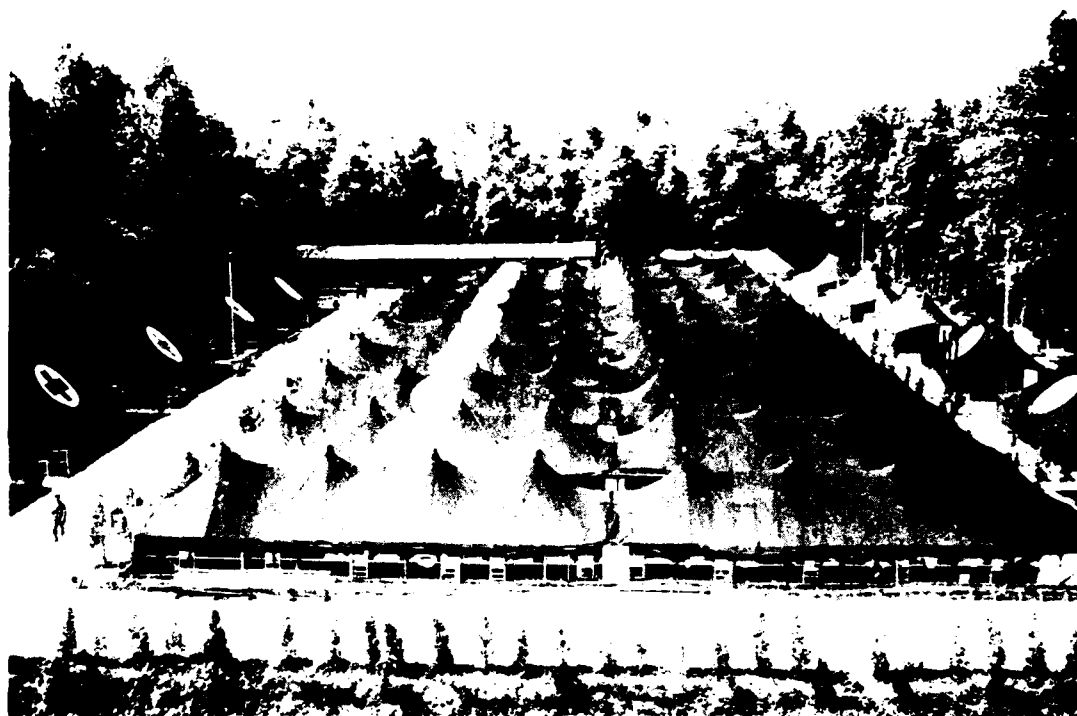


FIGURE 120. Psychiatric service in tented section, 130th General Hospital.

specific instructions to ADSEC, Communications Zone, that all neuropsychiatric patients from First and Ninth U.S. Armies should be sent to the 130th General Hospital.

After receiving a report from Lt. Col. (later Col.) William G. Srodes, MC, neuropsychiatrist of the First U.S. Army, that he had been tagging neuropsychiatric patients for the 130th General Hospital but they were not getting there, Colonel Thompson took another trip to the 130th General Hospital. He found that the commanding officer had conferred with Headquarters, ADSEC, Communications Zone, and the Commanding Officer, 818th Hospital Center, and had brought about an agreement that all neuropsychiatric patients coming into the center would be transferred directly to the 130th General Hospital. Visiting Headquarters, ADSEC, Colonel Thompson found that the medical staff there had a good understanding of the needs for early treatment of neuropsychiatric cases and were in full agreement with plans for the evacuation of such patients to the 130th General Hospital. He learned, furthermore, that all neuropsychiatric patients coming out of the First and Ninth U.S. Armies went to the 818th Hospital Center at Liège (fig. 123), and it was only a little over an hour from there to the 130th General Hospital at Ciney. The medical liaison officer from the Ninth U.S. Army was seen, and he confirmed the fact that all cases from that army came through the 77th Evacuation Hospital and were tagged for the 130th General Hospital.



FIGURE 121. —Headquarters, Rehabilitation (training) Section, 130th General Hospital.

Visiting the 818th Hospital Center, he found there, too, that the commanding officer, Col. Robert B. Hill, MC, and his evacuation officer were in complete agreement with the necessity of transferring all neuropsychiatric patients to the 130th General Hospital. In fact, Colonel Hill was anxious to get the training section of the 130th General Hospital firmly established and operating so that the chateau which had been designated for the training section of that hospital would not be lost to the Medical Department through lack of use. Colonel Hill stated that he had a large bus that could be used for transporting patients to the 130th General Hospital. He also remarked that the 130th General Hospital was using its own transportation to take patients to the replacement depot near Liège daily, and there was no reason why this transportation could not be used to take neuropsychiatric patients from the 818th Hospital Center to the 130th General Hospital.

Finally, Colonel Thompson visited the 28th and 56th General Hospitals, Liège, Belgium, and the 298th General Hospital. These were part of the 818th Hospital Center and were receiving the bulk of neuropsychiatric cases in the center. They did not have a very clear picture of the relationship of the 130th General Hospital to the center. When the situation was explained, these hospitals promised their full cooperation. During the course of these visits, it was learned that the 818th Hospital Center did not hold patients over 10 days, which was an added argument for the use of the 130th General Hospital.

These efforts by Colonel Thompson brought results. For the first time since the hospital began operating, neuropsychiatric admission began to ex-



FIGURE 122.—Surgical ward, 130th General Hospital.

ceed all others. This continued through the last week in March and most of April 1945 (figs. 124 and 125). By that time, however, the front had again so far outdistanced the general hospitals that orderly evacuation to the 130th General Hospital was not appropriate in many cases. At the same time, the emphasis in the theater changed from that of saving and rehabilitating manpower to that of boarding and evacuating patients to the Zone of Interior as rapidly as possible. Accordingly, patients were being flown to large centers in and about Paris (fig. 126), bypassing intervening installations (p. 457).

51st Station Hospital.—The 51st Station Hospital was a special neuropsychiatric unit which had been organized in North Africa and had worked its way up through Italy. It came into the European theater in November 1944 as a fully equipped and efficiently working unit with much experience. When Colonel Thompson visited the hospital on 29 November 1944, it was located at Dijon and was receiving neuropsychiatric patients from the Seventh U.S. Army and a limited number from the Third U.S. Army. Colonel Thompson thought it would be feasible for the 51st Station Hospital to receive neuropsychiatric patients directly from both Third and Seventh U.S. Armies. In that way, the hospital could perform a mission identical to that of the 130th General Hospital for the First and Ninth U.S. Armies. The hospital, however, was already quite far to the rear.

Colonel Lemkau, acting for Colonel Thompson during the latter's temporary duty in the United States, attempted to implement this plan on a firmer basis. The support of the Surgeon, Southern Lines of Communication, was

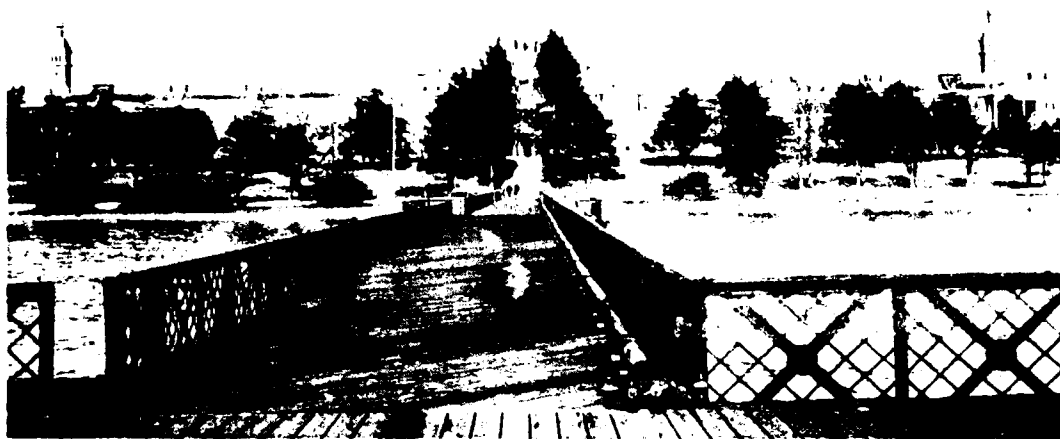


FIGURE 123.—Buildings and grounds of 818th Hospital Center, Liège, Belgium.

obtained. On 29 December 1944, the 51st Station Hospital was moved up to Lunéville. Nevertheless, it was never close enough to the armies it was supporting for the efficient discharge of its mission. Neuropsychiatric casualties could not be evacuated to it in the numbers planned. Furthermore, as with the 130th General Hospital, the mission of the 51st Station Hospital was decidedly altered during the German winter offensive. Surgical teams were attached, and the hospital's mission became surgical.

Summary

The establishing of specialized hospitals for the care of neuropsychiatric patients was a tremendous project requiring great effort by all concerned. When established and operating as planned, the results were well worth the effort; however, owing to the tactical situation, they could not always be used as intended. Difficulties encountered in establishing these specialized facilities were illustrative of the type of problems met in the general area of hospitalization and evacuation. In addition to specialized facilities, Colonel Thompson was involved in planning and establishing policies for evacuation and hospitalization of neuropsychiatric patients within field units, to and from other fixed hospitals, and from the theater to the Zone of Interior. The latter was, at times, a particularly difficult problem. Certain aspects of the handling of neuropsychiatric patients in field units during combat are discussed under the heading that immediately follows.

Neuropsychiatric Services With the Field Armies

It was necessary for Colonel Thompson to have at all times accurate knowledge of the state of mental health of all troops in the theater and of what was being done to maintain mental health, for as an adviser in his specialty to General Hawley he had to provide dependable information and to submit appropriate and timely recommendations, either on his own initiative or in response to specific direction by his superior officers. As a staff officer in the headquarters of the theater commander, it was also his duty to supervise activities within his special field in all subordinate echelons to insure that established theater policies, procedures, and doctrine were being adhered to and successfully carried out.

In accordance with the general responsibilities and duties of a staff officer, a consultant did not exercise command. He could not lawfully give direct orders in his own right to commanders of subordinate units. However, as an officer on the theater Chief Surgeon's staff—and in exercising staff supervision—he was bound only to stay within limits of the policies and directives of the theater commander and the technical (medical) doctrine established by General Hawley. Inspections and visits enabled him to observe activities in the field and offer on-the-spot suggestions for correction of any deficiencies observed. When changes in technical doctrine or establishment of new doctrine were necessary, he could make appropriate recommendations for their adoption to General Hawley (through Colonel Middleton and Colonel Kimbrough). When it was found necessary to issue orders to commanders of subordinate echelons, he could again submit specific recommendations through his immediate superior officers and General Hawley. Upon approval of his recommendation, Colonel Thompson was usually called upon to prepare for General Hawley or the theater commander, as appropriate to the case, proper directives implementing their decisions.

Field Army psychiatrists.—In his day-to-day dealings with the Armies, Colonel Thompson found it expedient to use technical channels. His technical channel of communication with Armies was through the consultant in neuropsychiatry to the Army surgeon. In neuropsychiatric circles, this officer was commonly referred to as the Army psychiatrist. In a letter, 8 July 1944, to Col. (later Brig. Gen.) William C. Menninger, MC, Consultant in Neuropsychiatry to The Surgeon General, Colonel Thompson described his relationship with the Army psychiatrist as follows:

In one of your recent letters you asked about the Army psychiatrist. I presumed that you knew about this since they arrived over here already appointed in that position. However, Lt. Col. Srodes did replace the psychiatrist who originally came with that Army. The Army psychiatrist is the only position between mine in the Office of the Chief Surgeon and the division psychiatrist. He acts as Consultant in the Office of the Army Surgeon, and supervises the work of the division psychiatrists, as well as the psychiatric services in the evacuation hospitals, and the special N.P. unit. I can report that we have excellent men in the positions.



FIGURE 124. Neuropsychiatric program at main hospital, 130th General Hospital. A. Physical evaluation on admission. B. Recreation shuffleboard in tented area. C. Physiotherapy.



FIGURE 121. Continued. D. Occupational therapy. E. Evaluation of treatment.
F. Determining disposition of patient and recommended assignment.

During the major portion of the fighting in Europe, the Army psychiatrists were: Colonel Srodes, First U.S. Army; Maj. (later Lt. Col.) Perry C. Talkington, MC, Third U.S. Army; Maj. Alfred O. Ludwig, MC, Seventh U.S. Army; Lt. Col. (later Col.) Roscoe W. Cavell, MC, Ninth U.S. Army; and Lt. Col. (later Col.) Joseph S. Skobba, MC, Fifteenth U.S. Army.

In the early days of the theater, a vigorous program was embarked upon to carry the principles of preserving mental health to men and officers of the line. With the concurrence of the First U.S. Army, Colonel Parsons spent considerable time and effort to carry out this program. He lived with the units, held daily instructional periods, and joined informal conferences among the officers in the evenings. The work was carried on later by Colonel Srodes. When division psychiatrists were appointed in late 1943, much of this activity was passed on to them (p. 321). Guidance of division psychiatrists and of general-duty medical officers, as well, was effected through the Army psychiatrist and formal instruction at the school of neuropsychiatry established at the 312th Station Hospital in the United Kingdom.

Tactical organizations and units in North Africa.—The inadequacy of plans and preparations for neuropsychiatric services, particularly in tactical organizations and units, was suddenly placed in sharp focus when final preparations were being made in October 1942 for the North African invasion. Except for the unofficial and opportune presence of a psychiatrist in the 1st Infantry Division, it was evident that psychiatry would be represented no further forward than general hospitals. The 400-bed evacuation hospitals had a table of organization position for a neuropsychiatrist, but no such units were in the theater at that time.

At the suggestion of General Hawley, Colonel Thompson visited Col. John F. Corby, MC, who had been designated surgeon for U.S. forces involved in the operation. Colonel Thompson advised him to consider more seriously the problem of handling neuropsychiatric casualties and urged that he take along a consultant in neuropsychiatry. Colonel Corby did not seem inclined to accept Colonel Thompson's advice but did say that, if the need for a psychiatrist developed, he hoped that one could be provided the force. Colonel Thompson assured him this would be done, and he discussed this eventuality with Captain Hanson, Colonel Parsons, and some other psychiatrists, as well as with Colonel Middleton. There was general agreement that Captain Hanson, because of his previous experience, would be the logical one to go.⁴⁸

The invasion of North Africa took place on 8 November 1942. Not long thereafter, on 21 January 1943, a cablegram was received in the European theater from the North African theater, reading: "Select competent psychiatrist for assignment to ABS." It was brought to Colonel Thompson's attention a few days later. Conferring with General Hawley, Colonel Thompson proposed his own name along with that of Captain Hanson. General Hawley selected Captain Hanson for the assignment. Prior to departing for North

⁴⁸ See footnote 40, p. 323.



FIGURE 125. Activities at the Rehabilitation (Training) Section, 136th General Hospital. A. General view of wards. B. Patients arriving in area.

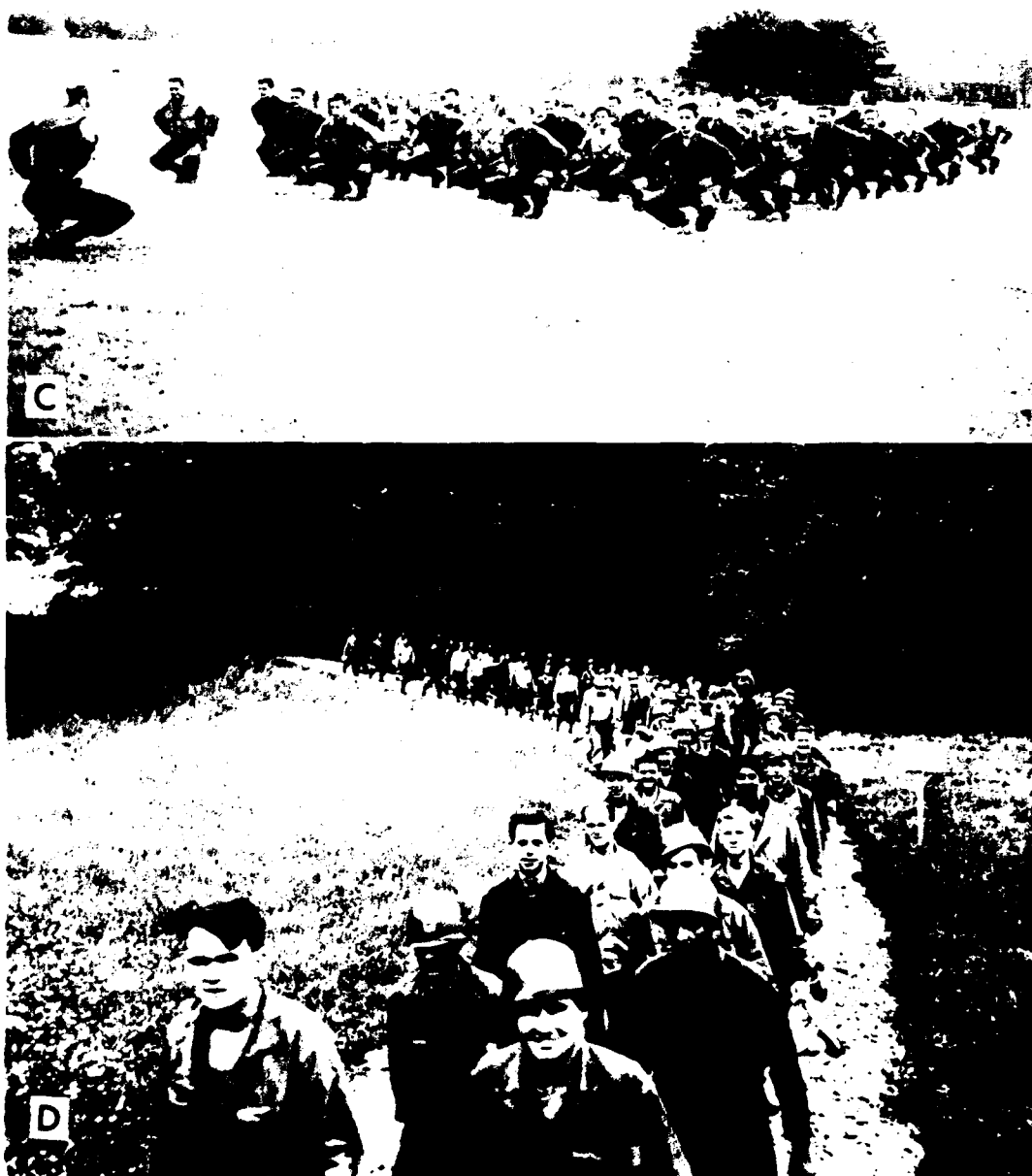


FIGURE 125. Continued. C and D. Physical conditioning.



FIG. 16-125. (Continued) E. Group psychotherapy. F. Military training utilizing sandtable.



FIGURE 125. Continued. G. Information and education activities. H. Retraining shop in radio repair.



FIGURE 125. Continued. I. Retraining shop in auto mechanics. J. Retraining in draftsmanship.



FIGURE 126. 91st Medical Gas Treatment Battalion, Giessen, Germany. Patients were evacuated to Paris, France, or directly to United Kingdom, April 1945.

Africa, Captain Hanson met in conference with Colonel Thompson, Colonel Parsons, and other neuropsychiatrists. Out of these conferences came a tentative plan for the organization and operation of neuropsychiatry in the combat zone, the soundness of which later developments confirmed in many respects. The plan also contained a proviso that detailed recommendations of diagnosis, treatment, and disposition would be forwarded to Colonel Thompson after further study under combat conditions.

In November 1943, Colonel Thompson was given permission to visit the North African theater. He departed on 13 November 1943 and remained in North Africa until 15 December 1943. There he studied U.S. Army records and statistics, observed neuropsychiatric cases within a few hours after evacuation, interviewed medical officers, and visited clearing stations, evacuation hospitals, general hospitals, and a convalescent hospital. He studied Canadian reports and statistics, interviewed several division psychiatrists, and observed the Canadian 15th General Hospital. He conferred with the British adviser in psychiatry, interviewed British corps psychiatrists and observed their corps exhaustion centers, and observed advanced psychiatric wings of general hospitals, general hospitals, and casualty clearing stations.

Upon his return, Colonel Thompson submitted detailed reports on his observations of United States, Canadian, and British forces in North Africa and Italy.⁴⁹ He also made recommendations dealing with the function and training of medical officers in line organizations; indoctrination of line officers; selection, appointment, and training of division psychiatrists; organization, functions, and training of neuropsychiatric personnel in evacuation hospitals; establishment and training of a cadre for forward neuropsychiatric hospitals; hospitalization in specialized facilities in the United Kingdom; and the rehabilitation and return to duty of psychoneurotic casualties. In these recommendations, he stated that such matters as methods of treatment, evacuation procedures, and diagnostic terminology should be explicitly set forth in directives, but the indoctrination of all personnel in basic tenets had to be accomplished through formal courses and personal informal contacts.

Colonel Thompson's recommendations were published on 6 January 1944 as Circular Letter No. 2, Office of the Chief Surgeon, Headquarters, ETOUSA, subject: Early Recognition and Treatment of Neuropsychiatric Conditions in the Combat Zone. At this stage in the development of the European theater, the document was most succinct, yet comprehensive, and remarkably prescient. No need was found to change it during the period of combat operations in the theater, and much of the material on diagnosis and treatment was later incorporated in the Manual of Therapy, European Theater of Operations.

⁴⁹ (1) Letter, Senior Consultant in Neuropsychiatry, to Chief Surgeon, ETOUSA, 23 Dec. 1943, subject: Canadian Psychiatric Services in North Africa and Italy. (2) Letter, Senior Consultant in Neuropsychiatry, to Chief Surgeon, ETOUSA, 31 Dec. 1943, subject: Psychiatric Services in the U.S. Army in NATOUSA. (3) Letter, Senior Consultant in Neuropsychiatry, to Chief Surgeon, ETOUSA, 31 Dec. 1943, subject: British Psychiatric Services in Middle East, North Africa, and Italy.

Exhaustion centers.—However, the most pressing problem at this time was the provision for neuropsychiatric services behind the divisions. In North Africa, two small station hospitals were used, which held patients for not over 14 days. These hospitals, which received patients directly from evacuation hospitals, had returned over 60 percent of them to noncombat duty in base sections, whereas other fixed hospitals had returned over 60 percent of their neuropsychiatric patients to the Zone of Interior. When Major Hanson visited the European theater in mid-January 1944, a conference was held with Colonel Spruit. In attendance were Major Hanson, Colonel Srodes and Colonel Thompson. Major Hanson was very influential in showing the need for special neuropsychiatric facilities between evacuation hospitals and general hospitals in the rear. Colonel Thompson suggested that personnel could be trained and made available at the three neuropsychiatric hospitals in England and such a special hospital could be brought into existence when the need arose. Colonel Spruit was convinced that a special forward neuropsychiatric hospital was needed, but he was of the opinion that it should be a field hospital under army control. At any rate, there was concurrence in the general principle, and the way was opened for further planning.

At this stage, Colonel Thompson felt that the evacuation hospital with its organic neuropsychiatric facilities and personnel should do all in its power to treat and return neuropsychiatric casualties to duty. The additional hospital that he was proposing was to take care of patients the evacuation hospitals could not send back to duty and for whom there was good prognosis for quick recovery. Apparently, the First U.S. Army did not want to change its prevailing practices in the employment of its hospitals, and there were no field hospitals available for establishing holding facilities for exhaustion cases as contemplated by Colonel Spruit.

At the Medical Consultants Subcommittee meeting of 2 March 1944, Colonel Thompson was able to report that the basic principles had now received full support of General Hawley and that an apparently suitable compromise measure had been reached. While continuing to entertain the possibility of using a field hospital, the First U.S. Army had decided to make a 250-bed neuropsychiatric hospital based on a separate clearing company reinforced by neuropsychiatric personnel from evacuation hospitals. This meant that early treatment would be carried out in this special hospital at approximately the same level of evacuation as the evacuation hospital. The only objection that Colonel Thompson saw to this plan was the fact that the neuropsychiatric casualty would have to go through the evacuation hospital before getting to the special neuropsychiatric unit, and lengthening, by that much, the chain of evacuation and delaying early treatment.

The First U.S. Army made the invasion on 6 June 1944 and two weeks later had established two exhaustion centers based on Colonel Srodes' plan of reinforced clearing companies. Colonel Thompson wrote to Colonel Menninger on 8 July 1944, as follows:

I note that the special N.P. unit, which was made up from a clearing company, and called an "Exhaustion Hospital" is functioning very well with the army. Patients returning to this area have come back well treated through sedation, and approximately 90 percent had the term *Exhaustion* on the E.M.T.

On 3 August 1944, Colonel Thompson wrote:

Bill Srodes, the Army Psychiatrist, is keeping a cool head and is extremely helpful to the Division Psychiatrist. His arrangement of filling the two exhaustion centers instead of psychiatric services in Evacuation Hospitals seems to be working well. I should like to see another good try at the use of Evacuation Hospitals before I would say that Srodes set-up is better.

When Colonel Menninger visited the theater in September and October of 1944, it was generally agreed that the centralized exhaustion center provided the best service. Before Colonel Menninger departed, Colonel Thompson promised to submit detailed recommendations on the organization and equipment of an exhaustion center. On 11 November 1944, Colonel Thompson wrote to Colonel Hanson, as follows:

On the last day of Menninger's visit in this theater, we spent most of the time discussing the question of the best Army N.P. unit. * * * we came to the conclusion that the Field Hospital, with its three platoons, seemed to be the very best arrangement that could be set up. Colonel Menninger was going to recommend this through his office and I have already put it in writing for this theater. However, we have not gone into great detail about T/O and T/E, and your information along this line will be greatly appreciated. Eventually, it is hoped that a definite and separate N.P. unit based on these plans may become a permanent fixture. But, as we all know, this will take a great deal of time.

Since Colonel Srodes had been concerned with the planning of these exhaustion centers from the time of their inception in the European theater, Colonel Thompson visited him on 8 February 1945 and discussed the matter further with him. Colonel Srodes agreed to submit a detailed table of organization and equipment which the theater believed should be considered a permanent War Department organization.

In other armies that eventually fought in the European theater, psychiatric services behind divisions were variously handled in the absence of theater or War Department specifications. The Third U.S. Army kept its psychiatrists in evacuation hospitals, as originally suggested by Colonel Thompson, but had, in addition, a convalescent hospital to take the overflow from the evacuation hospitals. Colonel Thompson thought that this system worked well for the type of combat engaged in by this army. The Seventh U.S. Army used clearing companies to set up two exhaustion centers in the same manner as the First U.S. Army and had indeed used this system in the North African theater even before its use in the First U.S. Army. The Ninth U.S. Army set up one exhaustion center using a medical gas treatment battalion augmented by psychiatrists from evacuation hospitals. When field hospitals became available, this army immediately put them into use for the holding and treatment of neuropsychiatric patients in the army area.

Rest periods for the combat soldier.—Another matter of great moment to all combat forces in the theater was the concept of using rest periods for individual soldiers and units as a motivating factor in preventing loss of manpower from psychiatric disorders. The impetus for this idea arose in a report from The Surgeon General.⁵⁰ In sober, matter-of-fact language, the report pressed home the point that, unless an infantryman is motivated to look forward to a "break," he has nothing to look forward to but "death, mutilation, or psychiatric breakdown." Citing data from experiences of the Fifth U.S. Army in Italy, the report showed how a soldier in combat wore out "just as an average truck wears out after a certain number of miles." Obviously, the problem was how to get this information translated into appropriate action. Most psychiatrists or other medical personnel realized these facts and had been trying with varying degrees of success to apply them in their units. The approach now chosen was most direct and pointed. The Surgeon General's report was appropriately edited to include only those facts that were of immediate concern to a commander of a unit or organization. A terse, forwarding command letter, dated 4 October 1944, emanating from the theater headquarters read simply: "It is desired that copies of the inclosed extract from a report of the Office of the Surgeon General be furnished to the commanders of all organizations down to, and including, regiments and similar units."

As the staff officer of the theater most directly concerned, it remained for the theater senior consultant in neuropsychiatry to observe how the stated principles were being carried out, supervise their implementation where applicable, and recommend corrective action where indicated. Colonel Thompson visited the recreation center of the XIX Corps in November 1944. The center used five small hotels located in Valkenburg, Netherlands. Together, they accommodated 300 enlisted men and 34 officers. Men came for 48 hours of rest during which they were more or less on their own. Ample opportunity for recreation as well as bathing and getting new clothes were provided. Nembutal (pentobarbital sodium) was administered the first night, if indicated, but, otherwise, no medical treatment was carried out. The center was under the control of line officers, but a medical officer was in attendance.

During this same visit to units of the Ninth U.S. Army, Colonel Thompson inspected the recreation center of the 30th Infantry Division, which was located in a large monastery in Kohlscheid, Germany, and could house 1,000 to 1,200 men at one time. Soldiers came for 48-hour periods. At this rate, it was estimated that combat troops could be rotated to this center every 3 weeks. In fact, at the time of Colonel Thompson's visit, the first group to have visited the center had returned for its second visit. There were not enough beds for all of them, and some men had to sleep on blankets on the floor. In addition to a medical officer, there was a dentist, and the men had an opportunity to talk to a chaplain, a finance officer, and a representative of the judge advocate. The soldiers had a chance to bathe and get dry clothes.

⁵⁰ Monthly Progress Report, Army Service Forces, War Department, 31 Aug. 1944, Section 7: Health. (Colonel Thompson was also aware of the benefits gained in World War I where divisions were relieved in turn from trench warfare.)

A dance band played at each meal. The plan was similar to those employed by other divisions in the XIX Corps.

These and similar visits, plus information from other sources, indicated a need for more common understanding of the principles involved and a standardized program of rest for infantry divisions throughout the theater (fig. 127). Accordingly, on 14 November 1944, Colonel Thompson recommended that command action be taken to implement such a standardized program. Colonel Kimbrough recommended approval of the plan to General Hawley. But on this and numerous other occasions, any plan suggested, collided immediately with the objection that there was a serious shortage of manpower in the combat areas. In his capacity as the preventive medicine officer of the 12th Army Group, Col. Tom F. Whayne, MC, did everything possible, at his level, to arrange for units in that command to have some relief from the ardors of constant combat. It was an uphill fight.⁵¹

Special Projects for Nonmedical Agencies

Behavior varies from "normal," well-integrated adjustment at one pole to the disintegration of the psychotic at the other. It is a continuum which cannot be cut up into tight nosological groups. Accordingly, it was impossible to draw a line which absolutely separated neuropsychiatric cases from the rest. A broad line of distinction had to be arbitrarily drawn. The more obvious neuropsychiatric cases were funneled into medical channels and came within the purview of the Medical Department, while agencies other than medical often invited the concern of the theater senior consultant in neuropsychiatry in the more borderline cases. The types of cases involved were in the nature of mental deficiency, inaptitude, instability, minor psychoneuroses, and pathologic personality types. Many of the patients manifested no noticeable organic or functional disorders but required medical consultation to eliminate this possibility. Later, certain combat-exhaustion cases were to fall into this borderline category also.

Replacement depots. Replacement depots (later called reinforcement depots) in the European theater came under an organization initially known as the Ground Forces Replacement System. The surgeon of this command was Lt. Col. (later Col.) George G. Durst, MC. In addition to receiving and assigning individuals as replacements, depots received and assigned all personnel who had been discharged from hospitals after assignment to a detachment of patients. It was this latter function that originally resulted in conferences between Colonel Thompson and Colonel Durst. Proper assignment of neuropsychiatric patients following rehabilitation was a crucial factor in their complete recovery. As time went on, there were needs for psychiatric services at replacement depots arising from other sources, such as large numbers of casualties who offered physical complaints in absence of demonstrable organic disease, numerous discharges arriving from disciplinary training

⁵¹ See footnote 40, p. 323



FIGURE 127. Rest center for divisions of VI and XV Corps, Seventh U.S. Army, Nancy, France, March 1945. A. Men arriving at rest center. B. Issue of blanket and clean clothes after showering.



FIGURE 127. Continued. C. Meal served by attractive French waitresses.
 D. Cigarettes and candy purchased at post exchange.

centers in the United States and from within the theater, and occasional problems of maladjustment in cadre personnel.

There was no authorization for a neuropsychiatrist in the table of organization of a replacement depot. When the 33d Station Hospital was brought in to serve the 10th Replacement Depot in April 1943, an opportunity was presented to provide psychiatric service to that depot, and, although there was no specific position for a neuropsychiatrist on the staff of the station hospital, a neuropsychiatrist was assigned. Once assigned, he was placed on detached duty with the depot. Except for a short period when Capt. (later Maj.) Benjamin Cohen, MC, was actually assigned to the 10th Replacement Depot, this system of placing officers on detached and/or temporary duty with the depot had to be resorted to. By August 1944, it was necessary to have two full-time neuropsychiatrists attached to this depot from the 312th Station Hospital. This reduced the effective medical strength of the hospital, but there was no other satisfactory expedient.

When the Ground Forces Reinforcement Command was established on the Continent, the 19th Reinforcement Depot was activated at Étampes, France, with functions similar to the 10th Reinforcement Depot in the United Kingdom. Other depots were also established, but the 19th Reinforcement Depot was the key installation in receiving rehabilitated patients for reassignment to noncombat duties. Here again, an officer had to be provided on temporary duty from the 130th General Hospital. On 19 November 1944, while discussing with Colonel Durst the reassignment of patients who were being sent back to duty by the 130th General Hospital, Colonel Thompson promised that Captain Cohen—then assigned to that hospital—would be placed on detached service at the 19th Reinforcement Depot to initiate and supervise neuropsychiatric consultation services, but it was not until March 1945 that he could be released and reassigned to this duty.

With a small number of neuropsychiatrists borrowed from hospitals, a great deal was done in the replacement depots toward insuring the supply of only mentally and emotionally qualified soldiers to combat duties, making the maximum use for noncombat duties of soldiers who were unstable, rehabilitating soldiers who were still capable of improvement, and eliminating from military service soldiers who were grossly unfit. The relationships established in this way with the replacement system also helped solve problems of primary concern to the theater senior consultant in neuropsychiatry, as will be noted in what follows.

While Colonel Thompson was on temporary duty in the United States, he attended the first conference of psychiatrists in charge of consultation services at replacement training centers in the Zone of Interior. He learned that there were 33 such centers with consultation services, including, in addition to the psychiatrist, clinical psychologists and psychiatric social workers. At the time Colonel Thompson returned to the European theater, manpower shortages in combat units were becoming acute. A plan was under way to take thousands of soldiers from Communications Zone units and train them in

four replacement depots for assignment to combat duties. In addition, another depot was to be designated as an officer candidate school. In many respects, the situation was similar to that of replacement training centers in the United States. Colonel Thompson reasoned that an organized consultation service would be most appropriate and recommended that a service modeled after those in the United States be established. The Ground Forces Reinforcement Command also requested similar services. General Hawley did not concur in the recommendations and request. He interpreted such work to be concerned with basic training and stated that a theater of operations was no place to embark on basic training.

Disciplinary centers.—Information had come to Colonel Thompson from the British, from the experiences of Captain Hanson in Northern Ireland, and from other sources that neuropsychiatric services might be required in detention centers. On 5 February 1943, at a conference of the Chief Surgeon's Consultant Committee, Colonel Thompson expressed the need for study of this subject, which aroused the immediate concern of General Hawley. General Hawley quoted statistics indicating that less than 1 percent of offenders were restored to full duty from disciplinary barracks and that only a very low percentage of these ever made good afterwards. He said the staff should keep in mind the possibility of detailing a man permanently on the staff of the disciplinary center for the purpose of studying offenders, should the work grow in sufficient proportions to warrant it. In reply to a question by General Hawley, Colonel Thompson said there was an officer available in the theater who had knowledge and experience in the field of criminal behavior.

Again the problem lay in the lack of a mechanism by which a psychiatrist could be assigned and again it was solved by placing neuropsychiatrists on temporary duty with disciplinary centers from a medical installation to which they had been assigned for this purpose. The first incumbent was obtained from the 36th Station Hospital and placed on duty with Disciplinary Training Center Number 1 at Shepton Mallet, England. These officers had to be selected with great care because General Hawley insisted that the neuropsychiatrists assigned had to be of the highest order. "Those people [the neuropsychiatrists] have got to be pretty solid," he maintained, "or they [disciplinary center personnel] won't care whether they have any psychiatrist or not."⁵²

By the end of 1944, stockades of various base sections had grown in number as well as in census, and stockades at replacement depots were equally well populated. Neuropsychiatric service had been well accepted by disciplinary training centers. The increase in malefactors also resulted in requests for additional neuropsychiatrists to help in disciplinary, rehabilitation training. It was no longer feasible, however, to continue depriving hospitals of trained neuropsychiatrists for this duty. In January 1945, it was necessary to confer with the Office of the Provost Marshal, Headquarters, ETOUSA, and submit

⁵² Minutes, Chief Surgeon's Consultant Committee meeting, 30 April 1943.

recommendations for permanent modifications of the table of organization of a disciplinary training center to provide for neuropsychiatry personnel. The recommended changes were approved. Qualified psychiatrists were found to fill the newly created positions.

Although results at these centers were not gratifying in terms of men returned to useful duty, the work of the neuropsychiatric personnel was of considerable value to the theater and the Army as a whole in many ways. Case records were worked up on all individuals, and expert opinion was provided in medicolegal aspects of disciplinary procedures, thus assuring justice to the individual prisoner and broadening the scope of military corrective measures. Special studies developed techniques in dealing with the military offender and uncovered personality factors that could help identify his type in the unit or at an induction center.

Special training units. In early 1944, it was realized in the ETO that special training units would be needed so that maximum use could be made of marginal soldiers who couldn't adapt to normal military assignments and yet were not sufficiently mentally ill to be admitted to medical treatment facilities. It was hoped that considerable numbers of physically fit men could be put to gainful use who were otherwise serious liabilities to the military effort. Thus, the project for recouping this lost manpower involved the establishment of a recovery center. On 20 February 1944, Colonel Thompson explained the project to Colonel Menninger, as follows:

We are just about to open another activity called the recovery center. This will be under line officers, and the trainees will be those in whom no definite mental disorder exists, but who manifest poor adjustment through incorrigibility, repeated physical complaints without demonstrable basis, and unwillingness to work, or inaptitude for any special work. The object is to fit these men, through special military training, for assignment to labor units or similar organizations in this theater. All soldiers going to the recovery center will be screened through the 312th Station Hospital (N.P.).

On 6 February 1944, Colonel Thompson was summoned to General Hawley's office and conferred with his executive officer, Colonel Doan, on correspondence proposing the establishment of the recovery center. On 9 February, Colonel Thompson accompanied Colonel Spruit to Headquarters, Western Base Section, ETOUSA, where they conferred with the Surgeon, Western Base Section and inspected the proposed site at Haydock Camp, approximately 20 miles from Liverpool. This camp had a capacity for 250 to 300 men with sufficient room for expansion by tentage. The Western Base Section surgeon expressed a strong desire to have a full-time medical officer and some enlisted personnel on the table of organization of the center because a dispensary was obviously needed. It had been previously agreed that no psychiatric personnel would be required. Conferring later in the day with G-1 (personnel and administration) of Western Base Section, it was discovered that no cadre personnel had been selected pending receipt of definite word from Headquarters, ETOUSA, to go ahead with the project. The conferees agreed that it would be desirable to have on the staff of the recovery center

one or more line officers who had been incapacitated from frontline service in the North African theater.

The question of whether trainees should be screened by psychiatric personnel before assignment to the recovery center was raised. Plans called for all trainees to be screened by the neuroses center at the 312th Station Hospital before assignment to the recovery center. At the Chief Surgeon's Consultant Committee meeting of 25 February 1944, Colonel Kimbrough, however, stated that he thought this procedure was very cautious and a little bit drastic. General Hawley replied that all psychiatrists in the theater had to be agreed on this screening for if they were all allowed to send individuals directly to the recovery center, there would be no reason to maintain the neuroses center at the 312th Station Hospital. But when the recovery center was established, the 96th General Hospital as well as the 312th Station Hospital was authorized to send patients directly to this center. Eventually, after invasion of the Continent when troops were deployed over a wide geographical area, all general hospitals were permitted to send patients directly to the recovery center.

Capt. (later Lt. Col.) Robert H. Sipes, Inf., was designated commanding officer, and the center was officially established on 17 March 1944 as the Services of Supply Recovery Center.⁵³

Operations at the center proceeded smoothly. Psychiatric consultation was available from a nearby hospital. Colonel Thompson was required to do little but check periodically on the type of personnel being sent there and advise on training programs. The one problem the center encountered lay in the fact that it belonged to no particular service. Although the recovery center was rehabilitating men, it did not come under the Rehabilitation Division, Office of the Chief Surgeon, Headquarters, ETOUSA, because it was not desirable, psychologically, to have it associated with the medical service.

A year after the center was established, it had received a total of 1,278 men for training. Disposition had been made of 996 patients, of which all except 41 had returned to duty in the theater. Approximately half of those returned to duty went to general assignments in combat units. The Ground Forces Reinforcement Command commented very favorably on the graduates of the center. Colonel Thompson thought that the unit made good soldiers out of the majority of the trainees.⁵⁴

Quartermaster work battalions.—The role and importance of a consultant are sometimes more clearly defined when he is not consulted or when his advice is not accepted in a matter that concerns him. Instances can be found in both civil and military administrations. The European theater also provided an example.

In September 1944, over 4,500 enlisted men and officers, mostly combat-exhaustion patients, had been assigned to the detachment of patients of two general hospitals and subsequently detached to a Quartermaster work battalion. The Quartermaster battalion had placed these men in companies

⁵³ General Orders 37, Western Base Section, Services of Supply, ETOUSA, 17 Mar. 1944, sec. II.

⁵⁴ See footnote 44, p. 328.

widely scattered over all of France, and the hospitals had no further control over them. Colonel Thompson was faced with the problem of screening these men and officers in order to make a decision on each case for definite assignment or rehospitization.

The situation had its birth in the few weeks following D-day when there was no way to dispose of combat-exhaustion patients evacuated out of the First U.S. Army except to send them back to the United Kingdom. On 12 July 1944, Colonel Thompson had already conferred with Brig. Gen. (later Maj. Gen.) Albert W. Kenner, Chief Medical Officer, Supreme Headquarters, Allied Expeditionary Force, and the Surgeon, First U.S. Army, on the objection to letting neuropsychiatric patients "escape" to England. On the following day, plans had been made with the Chief of Staff, First U.S. Army, to establish at an early date a recovery center similar to the one in England to handle certain patients very carefully screened by the army's exhaustion centers.

On 23 July 1944, in reply to a proposal that combat-exhaustion patients "escaping" from an army be handled in replacement depots for rehabilitation and training, Colonel Thompson recommended that such patients remain under medical (psychiatric) care and treatment until a definite decision could be made as to return to combat, noncombat assignment, or further evacuation. He qualified his recommendations by saying that this did not preclude establishment of special labor units composed of graduates of recovery centers similar to that in the United Kingdom and reiterated that patients currently being sent there were not the ordinary run of exhaustion patients but incorrigible psychopaths and borderline mental defectives.

Meanwhile, unknown to the theater senior consultant in neuropsychiatry, the Commanding General, ADSEC, had been directed in no uncertain terms by a letter from theater headquarters, dated 26 July 1944, on how to dispose of "cases of Battle Exhaustion not immediately returnable to combat but who no longer require medical treatment and supervision * * * ." The letter directed that such patients, still capable of some service and certified by medical authorities as not being returnable to combat for at least an extended period, should be assigned to a detachment of patients of a Communications Zone hospital designated by the commanding general of ADSEC and should be formed into units for hard labor.

In a cable to the War Department, permission was then requested to form such labor units over and above the theater troops basis. The cable stated that the purpose was to provide a situation more strenuous than combat in which psychiatric casualties could be placed. The matter was referred to The Surgeon General who strongly opposed the plan because of its punitive implications. The War Department accepted The Surgeon General's opposition to the measure and disapproved the request.⁵⁵

Subsequently, in a memorandum to G-1, Headquarters, ETOUSA, dated 4 August 1944, General Hawley expressed his personal views on combat ex-

⁵⁵ Menninger, William C.: *Psychiatry in a Troubled World*. New York: The MacMillan Co., 1948, pp. 208-209.

haustion. General Hawley maintained that psychoneurosis was a condition, not a disease, that its basic cause was insufficient courage, and that fear was its primary motivating factor. He ventured the opinion that if cowards were summarily executed, there would be no psychoneurosis. He singled out as the great administrative and medical problem that group of soldiers who just did not have sufficient courage to sustain themselves in battle. This group, General Hawley wrote, included those who with only very great difficulty could ever be restored to combat but who could still be salvaged for some useful service. General Hawley stated that he was unalterably opposed to returning this group of soldiers to duty in normal units, combat or service, because it would be "merely placing rotten apples in barrels of sound ones." The milder cases more appropriately described by the term "combat exhaustion"—those who crack after months of acceptable combat service—"real psychoneuroses," and the obviously psychotic, the General wrote, were being taken care of.

General Hawley suggested that, organized into special units under specially selected officers and noncommissioned officers and properly administered, some useful work could be had from the problem group. Such units, he continued, "* * * should be worked hard. They should be quartered and fed under no better conditions than combat troops. There should be no attractive considerations to invite soldiers into such units."

The whole point of General Hawley's memorandum was this. He asserted that this problem soldier would always exist as long as he could escape combat by recourse to psychoneurosis, that it was up to command to face this problem squarely and realistically, and that the alternative questions facing the command were: Should this group of problem soldiers be made use of or should they be discharged from the service to be replaced with new drafts upon the population?

Over one thousand patients that had accumulated in the exhaustion centers of the First U.S. Army were received at the 5th General Hospital when it opened on the Continent on 1 August 1944. Within 3 or 4 days, 1,360 neuropsychiatric patients were turned over to the 90th Quartermaster Battalion. They were screened in 2 days by a group of 9 neuropsychiatrists drawn from staging general hospitals, and only 21 patients were hospitalized for further treatment. By mid-August, over two thousand patients had been turned over to the 90th Quartermaster Battalion while still assigned to the detachment of patients, 5th General Hospital. In late August, administrative control of the labor companies to which these patients had been sent was transferred to the 96th Quartermaster Battalion, and subsequent assignment of incoming patients was to the detachment of patients, 19th General Hospital. By the end of August, the number of patients so detached and dispatched to work units had reached over 4,500.

With the understanding that the 130th General Hospital (p. 333) was to open on the Continent on 1 September 1944, Colonel Thompson had recommended on 14 August 1944 that prevailing practices be allowed to continue, provided patients were sent to the 90th Quartermaster Battalion only after

proper sorting at army neuropsychiatric units, the 77th Evacuation Hospital, or general hospitals. He further recommended that screening by psychiatrists continue at the 90th Quartermaster Battalion and that plans be made for a more definite assignment of patients placed in service work units.

Following up his recommendations, Colonel Thompson initiated plans for the screening and disposition of these patients in conjunction with the Hospitalization Division, Office of the Chief Surgeon, Headquarters, ETOUSA, and Colonel Durst of Ground Forces Reinforcement Command. A list of neuropsychiatrists to perform the screening was submitted on 6 September 1944. Captain Cohen was initially placed in charge.

Meanwhile, the Commanding Officer, 96th Quartermaster Battalion, had requested that a study be made of the condition of his men, and Maj. Roy L. Swank, MC, neuropsychiatrist of the 5th General Hospital, made a longitudinal study of 3 companies over a period of 3 weeks and conducted a cross-sectional, spot-check study of 13 companies comprising 3,000 men during 1 week. The study revealed that many of these men still had handicapping symptoms, many were growing more concerned about their condition, and in quite a few instances they had been curbed and held under more strict regulations than others doing similar work.

The screening procedure ran into the same sort of problems that beset setting up the 130th General Hospital. Almost no screening was done during September. Colonel Thompson conferred on 5 October 1944 with Colonel Durst, Maj. (later Lt. Col.) William H. Barnard, MC, of the Hospitalization Division, and Captain Cohen. He added five more neuropsychiatrists to the screening team at the 19th General Hospital. Major Barnard and Colonel Thompson visited the hospital on 13 October 1944 to work out more details as to the reassignment of men attached to the Quartermaster battalion and found that only two neuropsychiatrists had arrived and just 208 men had been screened. The next day, Colonel Thompson checked on the whereabouts of the psychiatrists ordered to the 19th General Hospital and placed four more on the list. On 17 October 1944, Colonel Thompson again visited the hospital, this time with Colonel Menninger, who was visiting the theater. Six psychiatrists were present, of whom three were recent arrivals. Over 800 patients had been screened, but it was discovered that most of these were recent arrivals at the 19th General Hospital from other hospitals rather than patients with the 90th and 96th Quartermaster Battalions. Word had also just been received that the only noncombat assignment open to those going back to duty would be as prisoner-of-war guards and military police. Colonel Durst had to be called upon to rectify this situation.

On 1 November 1944, approximately half of the men had been screened, but the process was absolutely at a standstill because Normandy Base Section had not found transportation to get approximately 2,000 men to the hospital. Nine psychiatrists were present at this time, and their need in hospitals from which they had been withdrawn was becoming critical. Moreover, half of the patients screened had to be hospitalized. That afternoon Colonel Thompson

met with representatives of the Hospitalization Division and the Deputy Chief Surgeon, ETOUSA, and urged that the screening be expedited. It was apparent that the screening was not getting the command support it required. Colonel Thompson voiced the opinion that the Medical Department was shirking its responsibility for providing adequate treatment. Following the conference, Colonel Thompson submitted a memorandum to Colonel Kimbrough on 1 November 1944 reviewing the situation from its beginning and including recommendations and statements made in the conference.

On 3 November 1944, a letter from the theater commander directing the Commanding General, Normandy Base Section, to expedite the screening process at the 19th General Hospital was brought to Colonel Thompson's attention. But one week later, he discovered that patients were still not being sent in from Normandy Base Section. During the remainder of the month, however, patients began arriving at the rate of some 200 per day, and the screening for all intents and purposes was completed as of the end of November. Isolated groups remained unscreened until V-E Day.

The conclusions of the examining board of psychiatrists that conducted the screening was that these men were not significantly helped by 1 to 3 months of noncombatant work therapy. Of 4,588 enlisted men examined, 2,503 (55 percent) required hospitalization. Of 51 officers examined, 47 (91 percent) required hospitalization.⁵⁶

A later sampling of the hospitalized group covering 467 patients revealed that 41.8 percent were boarded to the Zone of Interior. If this rate was reliable, the total return-to-duty rate of those who had been in the Quartermaster battalions would still be less than 60 percent. A still later followup study of 1,000 cases—500 hospitalized and 500 returned to duty directly—indicated that some 80 percent of the total 1,000 were on duty in the theater.

At the same time (October 1944), the 312th Station Hospital in England with its mental rehabilitation work had returned 89 percent to duty, and, significantly, the patients reaching the 312th Station Hospital were those who had gone through unsuccessful attempts at rehabilitation in all subordinate echelons of the evacuation chain for neuropsychiatric casualties.

Following his visit to the European theater, Colonel Menninger commented on the method of handling these cases, as follows:

Many of these had had inadequate treatment, having come directly from Exhaustion Centers. Despite this fact, it was reported that these men assigned to work in ordnance jobs, stretcher bearers in hospitals, and elsewhere had made excellent records. A superficial survey, however, indicated that many were noticeably maladjusted and this fact, plus the irregular method of carrying them as patients from the 19th General Hospital, made it necessary to develop a different plan.

In evaluating the results of the practice, he mentioned the fact that, in such patients with inadequate treatment, "* * * their guilt reaction, their feelings of inadequacy and the atmosphere of impersonalness at replacement

⁵⁶ Letter, Board of Psychiatrists, 19th General Hospital, to Chief Surgeon, ETOUSA, 26 Nov. 1944, subject: Report on the Mental Status of "Combat Exhaustion" Personnel Attached to the 90th and 96th Quartermaster Battalions.

depots can all combine to continue and increase the neurotic disability and thus convert transient neuroses into permanent, pension-seeking chronic neuroses."⁵⁷

The fact remains, nevertheless, that some of General Hawley's statements were borne out by the experiment as reported by the board of psychiatrists who conducted the screening. The more seriously ill members of the companies tended to "re-infect" the others, thus handicapping the improvement of the less ill. There was a considerable number of "repeaters"—men who were treated with apparent success in a forward medical echelon, returned to combat, and then relapsed after a very short period of time and had to be evacuated a second or third time. Finally, as General Hawley had predicted, there could be no doubt that this extra manpower provided considerable help during a most critical time in gaining the initiative on the Continent.

Neuropsychiatric Education and Training

Education and training were always continuing requirements in all aspects of medical activities in the European theater. An extensive program was especially needed in the field of neuropsychiatry because of marked differences between practice in an overseas military theater and civilian practice. Very few indeed were the officers in the theater who, at the time of Colonel Thompson's arrival, possessed military experience in this specialty. Those who followed were in many cases equally inexperienced, as were ancillary personnel—nurses, social workers, clinical psychologists, and attendants. The vast differences in civilian training and experience also necessitated a training and indoctrination scheme to establish order and understanding; otherwise, chaos would have resulted had each been allowed to practice in his own way.

In 1942, U.S. Army medical officers were being sent to a British Army training center for neuropsychiatrists at Northfield, one of two installations where neurotics from the British Army were being rehabilitated for useful duty. The course was an excellent one. However, it was believed that there would be distinct advantages in having a school maintained by and for the U.S. Army. First of all, the course at Northfield lasted 3 months, which Colonel Thompson thought too long. Furthermore, after completing the British course, the trainee still had much to learn about methods and procedures used in the U.S. Army. When one considered the fact that there had been more than 250 neuropsychiatrists with the American Expeditionary Forces in November 1918, it was an obvious impossibility to ask the British to train that many or more U.S. Army officers who would make up the full force in Europe in the days to come.

The U.S. Army had established the Medical Field Service School at Shrivenham, England, and there was a similar school operated by the Eighth Air Force. All training for medical elements was controlled and supervised

⁵⁷ Letter, Col. W. C. Menninger, MC, Director, Neuropsychiatry Consultants Division, Office of the Surgeon General, to The Surgeon General, U.S. Army, 13 Nov. 1944, subject: Report of Visit of Colonel William C. Menninger, MC, to Installations in the European Theater of Operations, 7 Sept. to 24 Oct. 1944.

by the Operations and Training Division, Office of the Chief Surgeon, Headquarters, ETOUSA, although the Army Air Forces school was relatively independent. However, a course in neuropsychiatry could not be opened at the Medical Field Service School because of the lack of qualified instructors and lack of case work. When the 36th Station Hospital arrived in England, the facilities and personnel to operate a school of neuropsychiatry became available. After preliminary discussions with the hospital's commanding officer, Colonel Parsons, a memorandum was submitted by Colonel Thompson on 25 January 1943, proposing the opening of such a school at this hospital. The proposal was favorably considered and detailed plans were pursued to open the school.

In agreement with Colonel Parsons, Maj. (later Lt. Col.) Jackson M. Thomas, MC (fig. 113), 36th Station Hospital, was selected to take charge of the school. Major Thomas was a well-qualified psychiatrist, a diplomate of the American Board of Neurology and Psychiatry, and an associate in psychiatry at the Harvard School of Medicine, Boston, Mass. Others on the hospital staff were also well qualified to instruct in particular fields.

From the start, it was the aim of the school to make the instruction as objective and practical as possible. In short, the courses were designed to meet the needs of the theater. The teaching procedure was explanation, demonstration, application, and examination. There were lectures, clinical conferences, and ward application under supervision of the clinical staff of the hospital. Later, demonstration teams were organized with personnel of the hospital taking roles in depicting battlefield neuropsychiatry in action.

Every opportunity was eagerly grasped to bring those with firsthand experience to the school so that students could learn directly about conditions under varying types of combat and with different types of troops. Officers returned from North Africa and other Mediterranean areas, either by rotation or as casualties, supplied this type of information, and reports from the consultant in neuropsychiatry in the North African theater provided excellent detail. British neuropsychiatrists, both civilian and military, aided materially.

Before the actual opening of classes, however, many details had to be ironed out. Complete courses of study had to be presented for approval to the Training Division, Office of the Chief Surgeon, Headquarters, ETOUSA. There was a lack of teaching aids, texts, and reference material. Because of the limited number of neuropsychiatrists in the theater, Colonel Thompson often had to make arrangements personally with commanding officers of prospective trainees for their attendance. This sometimes involved shifting neuropsychiatrists, temporarily, to cover vacancies resulting from an officer's being detached to the school. The school finally opened in April 1943, the first medical specialist school to be opened in the European theater.

The first course was for 13 neuropsychiatrists from general, station, and evacuation hospitals to satisfy the immediate needs of the theater, and it lasted throughout April 1943.

At the 30 April 1943 meeting of the Chief Surgeon's Consultant Committee, Colonel Middleton informed the conferees that the first course had been

completed and that 10 nurses and 9 enlisted men from general and station hospitals had been enrolled for a course to take place during May 1943. He also reported that Colonel Thompson planned to give four courses in June consisting of 5½ days each for medical officers from field units. There were to be 10 medical officers in each course. In addition, neuropsychiatrists from hospital staffs were to be sent to field medical units for a period of 2 weeks in order to gain experience and learn about life in a line unit.

General Hawley commented, as follows:

I follow with a great deal of interest the training of the general medical officer and battalion surgeon in psychiatry. I hope he can be given something helpful and a little knowledge won't become a dangerous thing if we don't give him the idea that he is an expert psychiatrist after a week. I think it is correct to check the scope of the instruction given * * *. I think a great deal can be done in courses like this—not attempting to go very deeply into the subject * * * give him some very practical suggestions. I think the assignment of the officers at the 3d Station Hospital in the field is a splendid idea. It will give them very much background. I think it might well be extended to other people in the hospitals. The people in the hospitals like to know how people in the field are getting along.

All the courses that had been initiated were continued, as needed, until the end of July 1943. At about this time, a majority of the neuropsychiatrists in hospitals had attended the school, and commanders of hospitals arriving in the theater found it difficult to release their neuropsychiatrists for 30 days so soon following their arrival. The combat units also had to curtail sending medical officers to the short courses, and two groups of flight surgeons had been instructed in their stead. Consequently, only one 2-week course for hospital enlisted men was given during August 1943. The time had come for a reexamination of the educational and training needs.

In the meantime, however, Col. Roy D. Halloran, MC, Chief, Neuropsychiatry Division, Office of the Surgeon General, U.S. Army, had written on 1 June 1943 to inform Colonel Thompson of the school of neuropsychiatry that had been established at Lawson General Hospital, Atlanta, Ga., under the direction of Col. William C. Porter, MC, assisted by Lt. Col. (later Col.) M. Ralph Kaufman, MC. Sometime later, Colonel Halloran wrote suggesting that it would be a good idea to have some neuropsychiatrists with experience in combat or in observing and treating combat neuropsychiatric casualties relate their experiences at the school. Colonel Thompson agreed that it was a splendid idea but expressed his apprehension over losing permanently any experienced officers.

Then, on 20 August 1943, Colonel Halloran wrote to Colonel Thompson as follows:

We are losing the executive officer of the school of military neuropsychiatry and chief assistant to Col. Porter, the Director. Lt. Col. Kaufman is being assigned to foreign duty and therefore, we find it necessary to locate someone who can teach military neuropsychiatry from the dynamic standpoint. I am wondering whether we could borrow the services of Major Jackson Thomas, whom you have been using in this connection in your area. Naturally we would replace him with a neuropsychiatrist who could be used in a similar capacity. I have in mind Major Howard Fabing, who is an excellent neurologist as well

as psychiatrist and has been assistant to John Romano at the University of Cincinnati. In fact, he was formerly with the Cincinnati Unit and is now chief of a section in one of our large station hospitals. He is very anxious to come to your area. Perhaps some such exchange at this time would prove mutually beneficial.

As you may understand, we are attempting to indoctrinate the large number of neuropsychiatrists that we have on duty at the hospitals of the Ground Forces and Air Forces and adapt their civilian talents to military problems. We feel it would be valuable if we could have the services of someone who has been familiar with the active problems in a theater of operations. If you are unable to send Jackson Thomas, perhaps you could pick someone else who has teaching experience and whose instruction would be considered fundamentally sound.

The next letter, dated 14 September 1943, received by Colonel Thompson from Colonel Halloran, stated: "I have heard indirectly that Maj. Jackson Thomas is to come to us for the purpose of teaching at the School of Military Neuropsychiatry, which is to be moved to a new unit in New York so that advantage may be taken of study of casualties newly returned from the various theaters." The letter confirmed the fact that Maj. (later Lt. Col.) Howard D. Fabing, MC, was being sent and added that Major Fabing had experience from service in World War I, had a wide acquaintance in England, and was very anxious to serve the European theater. "I believe that he will make an excellent teacher and coordinator, especially along the lines of organic neurology," concluded the letter.

As a direct result of losing Major Thomas, formal instruction at the school of neuropsychiatry remained suspended until Major Fabing arrived in November 1943. Throughout this whole period beginning in late 1942, General Hawley continued to stress the need for training general medical officers in field units and the indoctrination of their line officers as well. It was during this largely unavoidable lull in formal educational and training activities that the talents of Colonel Parsons were directed to the indoctrination of line officers, as described elsewhere. In cooperation with the Surgeon, V Corps, a temporary measure was adopted to continue the training of general medical officers from line units. Major Kelley was obtained from the 30th General Hospital and conducted a 1-week course using the facilities of three hospitals. Psychotics were seen at the 36th Station Hospital, combat neuropsychiatric casualties from North Africa were used in instruction at another hospital, and neuropsychiatric patients who had been "combed" out of divisions were available at the third.

By the time Major Fabing arrived in the theater, a major change in the hospitalization of neuropsychiatric patients was being completed. The 36th Station Hospital was being reserved for psychotic patients while neurotic patients and most of the staff of the 36th Station Hospital, as well, were being sent to the newly created 312th Station Hospital. This change also necessitated a relocation of the school of neuropsychiatry. Definite plans had been announced to commence immediately extensive and concentrated training of medical officers in line units and mobile hospitals, but instructions had to be issued to suspend sending trainees to the school until the new facilities were

ready. Colonel Middleton and Colonel Thompson both gave considerable personal attention to helping Major Fabing and the 312th Station Hospital prepare to resume instructional activities. Consideration now had to be given also to division psychiatrists. These had just recently been authorized by the War Department. Their training was a matter of prime concern since many of them were capable, general medical officers who had been hand picked for the position but who had no real experience in neuropsychiatry.

As a year of constant buildup with its attendant problems drew to a close, on 28 December 1943 at the Chief Surgeon's Consultant Committee meeting, General Hawley again expressed his concern and interest in the educational program, asking particularly about the indoctrination of combat doctors in combating battle neuroses. "It got off to a splendid start," he said. "What is its present state?" Colonel Kimbrough and Colonel Thompson were both able to inform him that the indoctrination of medical officers in line units from the battalion level and above and the training of division psychiatrists was to start momentarily. General Hawley said the program should be pushed.

And pushed the program was. The total effort was directed at personnel in line units and evacuation hospitals. Under the direction of Major Fabing, 700 general medical officers received the special 1-week course in neuropsychiatric first aid from 27 December 1943 to 15 July 1944. The Chief Surgeon's Operations and Training Division reported that, by the time D-day arrived, practically all medical officers in combat units who would come in contact with battle casualties had been through this course. During the same period—from the reopening of instruction at the 312th Station Hospital to D-day—40 evacuation hospital neuropsychiatrists, 80 evacuation hospital nurses, and 160 evacuation hospital and clearing company enlisted men were trained in courses specially designed for them. In addition, Major Lemkau, of the staff of the 312th Station Hospital, trained 15 division neuropsychiatrists in January and February 1944 at the school of neuropsychiatry.

While this program was going on at the school, personnel of general and station hospitals were not entirely neglected. As new hospital units arrived in the theater or were created, neuropsychiatric personnel were given the opportunity to spend 2 weeks at hospitals specializing in neuropsychiatry for on-the-job training under experienced officers, nurses, and enlisted men.

On 7 July 1944, about a month after D-day, Colonel Thompson wrote to Dr. Edward A. Strecker (fig. 128), who had visited the theater shortly before, that all the invasion plans for handling neuropsychiatric casualties had worked out satisfactorily and casualty rates were lower than anticipated. "I cannot but feel," said Colonel Thompson, "that part of this is due to our education of line officers, and division medical officers."

When Colonel Thompson was able to visit more units in combat at a later date, many officers expressed gratitude for the indoctrination they had been given. Comments made in a letter, dated 2 March 1945, from the division neuropsychiatrist of the 69th Infantry Division to Colonel Menninger illustrate well the sentiments of many. He wrote:



FIGURE 128.—Dr. Edward A. Streeker (second from right) viewing the monuments at Stonehenge, Salisbury Plains, Wiltshire, England, with (left to right) Colonel Thompson, General Hawley, and Col. Raymond E. Duke, MC, 16 March 1944.

I am sending herewith the material used in lectures on Combat Exhaustion. We are indebted to the 312th for an excellent course and this material was reproduced. Since writing I obtained their film on Combat Exhaustion and showed it to all NCO's and officers in the 369th Med Bn as well as most O's in the detachments.

We have been in combat since the 10th [February] and the indoctrination is paying dividends.

The film on combat exhaustion mentioned in the paragraph quoted was produced at the 312th Station Hospital in conjunction with the Army Pictorial Service of the Signal Corps. It showed the work being done there, the specific treatment given, the work of the mental-rehabilitation unit, and the teaching being given in the school of neuropsychiatry. There were some difficulties with the scenario and production of the film because of its range and scope. The film, which was in scenario in March 1944, was completed in the autumn of that year and was first shown publicly at the Empire Theater for personnel in General Hawley's office on 20 November 1944 with a running time of 1 hour. Later, copies of the film were distributed throughout the Army by Signal Corps film libraries. Copies were presented to the British, who had previously provided the U.S. Army with a generous number of prints of their film on combat neuroses.

Colonel Thompson lectured to almost all classes of medical officers going through the Medical Field Service School at Shrivenham. He frequently held clinics, ward rounds, and lectures at individual hospital installations. Professional meetings of medical officers of the Allied forces also presented educational opportunities.

In the waning stages of the war and the period immediately following the cessation of hostilities, the theater senior consultant arranged for participation by neuropsychiatrists in the broad educational program that was set up in the European theater. The general scope and intent of this program were described by Colonel Middleton (p. 253). A school of neuropsychiatry was reestablished at the 191st General Hospital, Paris, France, to give a comprehensive review of neurology and psychiatry while paying considerable attention to recent developments in general medicine. More advanced refresher courses were arranged for U.S. Army officers at teaching centers and hospitals in England, but redeployment was so rapid that full advantage could not be taken of the opportunities that were richly provided.

Visits in the Field

Although Colonel Thompson had to devote a tremendous amount of his time and energy to staff work at the theater headquarters, he still found or made time to visit units and installations in the field. There was more than enough to occupy him at theater headquarters alone. In addition, there were the obligations of liaison with representatives of the other Allied forces, participation in projects sponsored jointly with British civil and military medical authorities, and the amenities in conjunction with these. But to sacrifice visits and inspections in the field to these other activities would have meant reciprocal loss in consultant effectiveness. Regardless of the thoroughness of plans, the clarity of announced policies, or the accumulation of large amounts of data, the proof of their worth could be measured only in terms of their application in the field. The feedback from visits to the field was the servomechanism that directed the proper course of neuropsychiatric activities in the theater.

In broad terms, these visits to the field could be divided into two types, special and routine. Special visits were necessitated or suggested by some specific problem or activity. These included such matters as requested consultations, the solution of local personnel problems, inspection of hospital construction or modification, meeting advance parties of units due to arrive in the theater, and accompanying visitors to the theater on tours of installations.

The routine visits—although they could hardly be called routine in the sense that no two visits were exactly alike—were for the most part undertaken to see what was being done, to make corrections on the spot if necessary, and, generally, to get the consultant's feet on the ground. They helped him better to evaluate the capabilities and limitations of personnel and facilities with respect to the care of neuropsychiatric patients. Bits of information obtained on visits to individual installations or units eventually fitted together to show

definite trends and patterns. On particular occasions, the observations made were so significant that he would ask for a special report on the situation from the installation or activity visited. These reports, with appropriate comments by Colonel Thompson, could then be brought to the attention of his superiors in the Chief Surgeon's Office, as well as in the Office of the Surgeon General. Thus, he was enabled to keep General Hawley and his staff informed of significant events and problems in the field in a fully documented manner. Again, these routine visits to the field provided opportunity to answer questions and establish better rapport and understanding with those who were charged with actually carrying out the neuropsychiatric policies and procedures of the theater.

At least half of Colonel Thompson's time was spent in these special or routine visits in the field.

Personnel Management

Personnel management problems were time consuming and required good judgment and diplomacy. Many of the problems were obvious but were either impossible of immediate solution or were difficult to solve because many restrictions and concurrences were entailed. Very close liaison was required with the Personnel Division, Office of the Chief Surgeon, Headquarters, ETOUSA. Colonel Middleton also maintained close supervision over personnel matters, and, because of their often delicate nature, his arbitration was required in cases of conflicting interests and to insure the best and proper use of all personnel specialized in fields that were his concern.

There was first and always the need to know the abilities and location of neuropsychiatric personnel in the theater. Much of this information could only be obtained by personal interview and observation of the individual's work. One of the first things Colonel Thompson did upon his arrival in the theater, however, was to obtain through Colonel Halloran the complete listing of psychiatrists and their qualifications as established by the National Research Council. Although this list did not help him locate individuals, it enabled him to pick out the qualifications of those he met personally or impersonally as names in correspondence crossing his desk.

In late 1942 and early 1943, there were many misassignments of neuropsychiatrists. Some were brought to Colonel Thompson's attention directly from the individuals concerned by letter, word-of-mouth, or during inspections, and many in letters from Colonel Halloran. As late as July 1944, when the Third U.S. Army was staging for movement to the Continent, such misassignments could be found. An acquaintance of Colonel Thompson's, and a qualified neuropsychiatrist, was a general duty medical officer in an armored medical battalion. Colonel Thompson wrote to this officer, as follows:

I understand that your unit is part of the Third Army and I am writing to Major Talkington, consultant in psychiatry for that army, so that he may make contact with you and see whether you can be placed. I shall issue the usual challenge to him that if you are not needed in the army set-up we have need for psychiatrists elsewhere, but I am sure that he will find a psychiatric assignment for you.

A most important reason for knowing who the psychiatrists were, their qualifications, and their location was to be able to fill vacancies quickly without materially interrupting services. This last was no small task when one considers that, in spite of existing shortages in the theater and losses through normal attrition, personnel had to be found to fill the positions of evacuation hospital and division neuropsychiatrists as these positions were created and to fill vacancies in station and general hospitals arriving in the theater without their full complement.

Another problem in personnel management was that of promotions. First of all, tables of organization were often extremely inadequate or inequitable in the rank given neuropsychiatrists with excellent professional training or those who were required to handle a greater load than provided for in the tables of organization. Among the latter were neuropsychiatrists withdrawn from evacuation hospitals to man exhaustion centers. In the same category were those assigned to small hospitals for convenience and placed on duty with replacement centers, disciplinary barracks, and other temporary-duty assignments of considerable importance.

A solution, albeit not entirely satisfactory, to a problem of this nature was that attempted at the 36th Station Hospital.

With reference to K * * * 's promotion, I am still wrangling with lesser lights. The situation is this: We are organized under a Table of Organization which left no vacancies whatever nor opportunities for promotion. Here I have progressed to the point of getting higher authority to admit that our Table of Organization must be a separate or a special T O. Our bed capacity is considerably greater than we figured in the States and the rank appropriate will go in. In addition, I am holding that men who are trained militarily and professionally proficient to be diplomates of the American Board should hold the grade of major. By these devious means I hope to get him up in the not too distant future. He is the number one man of the list but there are several others * * *. Frankly there is no valid lieutenant in the outfit. None of the men are tyros. Keep your fingers crossed while I make every possible move to squeeze these through.⁵⁸

Two commitments made by the Office of the Surgeon General as to personnel were rewards of Colonel Thompson's trip to the United States. It was agreed that a certain allotment of graduates from the schools of neuropsychiatry in the Zone of Interior could be sent to the European theater upon request. Additionally, Colonel Menninger promised, whenever possible, to make known, by name, to Colonel Thompson the officers who were being placed in units to be activated for assignment to the European theater.

Clinical psychologists.—A personnel problem of sizable proportions arose in early 1945 in the commissioning of clinical psychologists (fig. 129). Enlisted clinical psychologists began arriving in the European theater in September 1944 in hospitals coming direct from the Zone of Interior. On 2 October 1944, War Department Circular No. 392 was published announcing provisions for the commissioning of these enlisted clinical psychologists. On 21 December 1944, a command letter was issued by the theater headquarters

⁵⁸ Letter, Lt. Col. E. O. Parsons, MC, 36th Station Hospital, to Dr. Winfred Overholser, 27 Jan. 1943.



FIGURE 129. Enlisted clinical psychologist working with patient at 130th General Hospital, Ciney, Belgium.

promulgating provisions of the circular to all unit commanders. In January 1945, applications began to trickle in and, in February, a great number appeared.

At first, Colonel Lemkau, who was acting consultant in neuropsychiatry during Colonel Thompson's temporary duty in the Zone of Interior, and then Colonel Thompson began to interview each applicant. It was also proposed that the applicant be given a practical test as well as an interview because personality was so important in this specialized type of work, and the manner in which he approached and dealt with patients was critical.

At about this time, a letter was also received from Lt. Col. (later Col.) Morton A. Seidenfeld, AGD, chief clinical psychologist in the Neuropsychiatry Consultants Division, Office of the Surgeon General, pointing out certain complaints he had received from clinical psychologists in the European theater as to their assignments and duties. As applications increased in number, Major Kelley was appointed Consultant in Clinical Psychology, ETOUSA, and assigned to the office of the theater senior consultant in neuropsychiatry to work under his direction. Major Kelley was admirably suited for this assignment. In addition to being a well-qualified psychiatrist, he was an associate member of the American Psychological Association and was the author of a text on the Rorschach method of personality testing by projective techniques.

In March 1945, Major Kelley made a thorough study of the work being done by clinical psychologists in hospitals on the Continent, and a number of important facts were elicited. In some hospitals, the psychiatrists and clinical psychologists were cooperating well, the psychologist assisting the psychiatrist

in the work of the neuropsychiatric section. In more than a few hospitals, clinical psychologists were being employed outside the neuropsychiatric services. In these cases, the commanding officer and psychiatrist did not understand how to make proper use of the clinical psychologist. In most instances of this nature, it was found that the psychiatrist was totally unfamiliar with the usual duties of clinical psychologists and consequently had not properly employed them as full-time assistants.

Since it was obvious that many clinical psychologists were not being properly employed, steps had to be taken to correct the situation. As a rule, an explanation of their functions sufficed to convince the commanding officer of a hospital to reassign them to appropriate duties. Administrative Memorandum No. 17, Office of the Chief Surgeon, Headquarters, ETOUSA, was published on 17 March 1945, to outline the duties of the clinical psychologist. A brief article on the same topic was also published in the *Medical Bulletin*, Office of the Chief Surgeon, ETOUSA.

In addition, meetings attended by neuropsychiatrists and clinical psychologists were held on the Continent and in the United Kingdom by Colonel Thompson, Major Kelley, and hospital center neuropsychiatric consultants. At these meetings, attempts were made to reach a mutual understanding as to the functions of clinical psychologists and to place the responsibility for their proper use on the shoulders of the hospital neuropsychiatrists.

Finally, every clinical psychologist who submitted a complaint that he was being improperly employed was personally interviewed by Colonel Thompson or Major Kelley. The subject was also made a matter of inquiry in routine hospital visits by the theater senior consultant and hospital center consultants in neuropsychiatry. In almost all instances, satisfactory adjustments were made.

A special function was evolved through coordination with the Adjutant General's Office, Headquarters, ETOUSA, in the use of a team made up of clinical psychologists and enlisted helpers in screening limited-assignment personnel who were being discharged from hospitals. Individual classification records (WD AGO Form 20) were brought up to date to show the nature of the patient's limited-assignment requirements, and recommendations were made as to his future assignments. The service was extended to all categories of limited-assignment personnel. At one hospital, a team made up of 1 psychologist and 2 assistants, during the period from 14 March 1945 to 25 May 1945, completed qualification cards and recommended assignments on all discharged patients—medical and surgical cases as well as psychiatric. A total of 1,190 patients were interviewed, and a followup at the replacement depot showed that, with only occasional exceptions, the assignment recommended by the psychologist was followed without change.

The work of clinical psychologists was severely handicapped by the lack of testing instruments, and efforts to obtain them met with only limited success. Further plans for group meetings, education, and other activities of clinical psychologists had to be discontinued following V-E Day. In all, 608 applica-

tions were processed by Colonel Thompson and his associates as of 30 June 1945. Of this number, 533 were rejected. The remaining 75 applications were forwarded to the War Department, which rejected an additional 33, approved 15 for commissioning, with decision still pending on the remaining 27.

Research

Colonel Thompson found it well-nigh impossible to conduct any carefully controlled, rigidly organized, research projects in the strictest sense of the term "research." Basic research with the classic design of control and experimental groups was usually out of the question. Proposals for conducting some well-conceived projects of this nature had to be rejected. On the other hand, certain studies had to be done in order to gain information necessary for the intelligent carrying out of the consultant's mission. The reader should realize that the basic treatment methods that were taken up and used in the theater—narcotherapy, insulin therapy, electric shock therapy, diagnosis by electroencephalogram—were all, to a considerable extent, applied research at that time (fig. 130). Actually, most of the research accomplished in the theater was of this same applied type. Since something had to be done, a course of action was selected using the best information available, and the results were assessed in any way possible for the purpose of improving techniques. Another type of research accomplished in the field of neuropsychiatry was in the nature of statistical or questionnaire studies.

Blast syndrome.—One of the problems that defied conclusive results was that which became known as "blast syndrome." The problem arose in the first weeks following D-day. On 15 July 1944, Colonel Thompson described it in a memorandum to Colonel Kimbrough as follows:

The problem of how much symptomatology was due to organic disturbances produced by blast, and how much was due to emotional factors was brought up at almost every visited center. Practically nine out of ten of the psychiatric patients gave a history of having been near exploding shells, and they related this to the onset of their symptomatology, some saying that they were blown out of the foxholes by a shell. In many there was a statement that they could not remember what happened for a period of time. It appeared that there was a danger of attributing too much symptomatology to organic damage, and thereby reverting to the old conception of "shell shock" of the last war. The general opinion was expressed that unless there was evidence of damage to the central nervous system, as shown by neurological signs or evidence of blast in other parts of the body, as shown by ruptured ear drums, hemoptysis, or other visceral signs, the diagnosis of blast syndrome would not be made in forward areas. Certain other differential points were discussed such as evaluation of amnesia which in organic conditions is usually retrograde and cannot be fully recovered under Pentothal [Sodium] hypnosis. Further studies of this problem will be carried out at hospitals at the base in cooperation with the senior consultant in neurosurgery.

When Colonel Thompson was at the Office of the Surgeon General in early January 1945, the possibility of studying blast conditions with electroencephalograms at the front was discussed. Colonel Thompson suggested to Lt. Col. William H. Everts, MC, Chief, Neurology Branch, Neuropsychiatry Consultants Division, Office of the Surgeon General, that two electroencephalographic



FIGURE 130.—Psychiatric treatment, 130th General Hospital, Ciney, Belgium. A. Electric shock. B. Administration of insulin.



FIG. 11. 130. Continued. C. Equipment for producing abreaction under narcosis. D. Patient undergoing narcotherapy.



FIGURE 131. Maj. Howard D. Fabing, MC.

machines be provided for this work near the front. One would be used at a clearing station so that records could be started as soon as possible, and the other would be further back, perhaps at the 130th General Hospital, where daily records could be continued.

In the meanwhile, Major Fabing (fig. 131), who had been the director of the school of neuropsychiatry, was permitted to conduct his own studies on blast syndrome. He found that by using Pentothal Sodium (thiopental sodium) hypnosis and appropriate sound effects, a patient who claimed to have been rendered unconscious for some time by a nearby explosion could regain his memory for the entire period of "unconsciousness." When this experience had been relived in detail, an injection of 10 cc. of Coramine (nikethamide) was given, and the patient was awake in less than a minute. Eventually, the patient was able to write his own account of the episode. By this method, Major Fabing was able to return 90 percent of his 80 cases to duty.

Ergotamine tartrate studies.— On 31 May 1944, The Surgeon General forwarded to the Chief Surgeon, ETOUSA, two excerpts from publications that dramatically told of the use of ergotamine tartrate as a remedy for "shell shock" and "battle reaction." The letter concluded: "We do not have any experience whatever with the use of this and know nothing further than what these articles state but you may want to suggest their trial in the hands of some competent individual."

After Colonel Thompson had written to him that ergotamine tartrate was being tried out in two hospitals, on 20 July 1944, Colonel Menninger wrote:

We want to think of Ergotamine Tartrate as being on an investigative level at the present time. In other words, we want to be sure that it is very cautiously used and we want to get the results from its use in a few places as to its indications, main effects and side effects, and results. We don't propose to issue it except under your authority * * *.

On 3 August 1944, Colonel Thompson wrote Colonel Menninger a brief résumé of what was being done with the drug.

We have been using Ergotamine Tartrate under control conditions at the 312th Station Hospital. This work is being done under Major Paul Lemkau. A return report on this should be available before long. Major Lemkau believes that there is value in the drug—that equally good results are obtained with the insulin and narcosis therapy. I should add that a group of 10 control patients in the same ward benefited almost as much on sugar capsules and all the nursing attention that the other patients received, so maybe it is the general atmosphere and the “total push” methods, are the important thing, and at any rate it is difficult to judge the value of any type of therapy in such a setting.

Colonel Thompson forwarded the report on the use of the drug to Colonel Menninger on 24 August 1944 with the following comment:

I am enclosing a copy of an account of our experience with Ergotamine Tartrate as written up by the medical officers of the 312th Station Hospital who did the work. Further investigation along this line is being continued and at the present moment they are attempting to combine this therapy with modified insulin so as to give the gain in weight which seems to be necessary. The use of this drug will be confined to our three N.P. hospitals until we know more about it.

These studies were examples of the type of research that could not be carried on except in an active theater. The acute conditions observed in patients recently evacuated from battle were not to be found in sufficient numbers in the United States.

Morale Service opinion survey technique.—On 27 October 1943, Colonel Halloran wrote to Colonel Thompson introducing Dr. Samuel Stauffer and Dr. Carl Hovland of the Morale Service, Army Service Forces. Colonel Halloran stated that these were men of outstanding ability who had worked closely with the Office of the Surgeon General and that Dr. Stauffer was one of the first to recognize that preventive psychiatry and morale were actually the same subject and had been instrumental in establishing liaison between the Morale Service and the Neuropsychiatric Branch of the Surgeon General's Office. Colonel Halloran added: “To my mind, the opinion survey technique for studying problems of human behavior has been a development of major importance in this war. It offers perhaps the most promising approach of any to problems of military psychiatry. Dr. Stauffer and Dr. Carl Hovland are highly skilled in the use of this technique and have already conducted surveys of considerable value in this field.”

On 24 March 1944, Dr. Kimball Young, a personal representative of Maj. Gen. Frederick H. Osborn, Chief, Information and Education Division, War Department, visited Colonel Thompson to cement further close working relationships between the medical and morale services.

From this beginning throughout the life of the theater, this close relationship was maintained. In a way, it could be said that the Morale Service

(later known as Research Branch of Information and Education) provided the means for conducting studies which the neuropsychiatrist wanted to have done but for which he had no facilities for accomplishing. Their reports were read with interest from the Chief Surgeon down to medical officers in the lowest echelons.

Even the facilities of this research organization were not able, however, to conduct a survey that was particularly desired by Colonel Menninger. A questionnaire had been used for a cross-section survey of troops in the United States with valuable and interesting results. Colonel Menninger wanted to have it applied to from 1,000 to 1,500 normal subjects who had 90 or more aggregate combat days on duty with an infantry battalion in order to determine how certain factors considered peculiar to neuropsychiatric patients appear in normal troops.⁵⁹ After many conferences and preliminary studies, it was advised by higher officials in the Research Branch of Information and Education that it might not be worthwhile to start the study at that particular time (March 1945). It was agreed that it should be held up until there was absolute certainty that the study could be carried through to completion, either in the European theater or some other theater.

Other studies.—In addition to the foregoing, some significant followup studies were completed, requiring the cooperation of field units, the Ground Forces Reinforcement Command, and the Information and Education Division. A particularly cogent and interesting study was that of approaching combat exhaustion on an epidemiologic basis. This study was, to a certain extent, prompted by the fact that some individuals in the theater thought there would be a sudden drop in neuropsychiatric casualties when soldiers found they could be evacuated for cold injuries. Col. John E. Gordon, MC, Chief, Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA, had amassed considerable data concerning the epidemiology of trenchfoot, which could be readily related to neuropsychiatric incidence for the same periods. Like data were available at subordinate commands. The completed study showed a remarkable similarity of conditions attendant on cold injury and neuropsychiatric breakdowns.

Supply

Supply personnel were able to handle problems of procurement, cataloging, storing, issuing, and the like to a certain point, but when a decision was required as to exactly what was needed, where it had to be, and in what amounts, the answer could only come from the using parties. So it was that as early as October 1942, Colonel Thompson made recommendations for the amount of sedative drugs required for every 10,000 men in combat. A later study revealed a lack of certain items in installations where they would be needed, and revised recommendations were submitted on 7 December 1942. Periodically thereafter, the Supply Division, Office of the Chief Surgeon, Headquarters, ETOUSA,

⁵⁹ Letter, Col. L. J. Thompson, to Col. O. N. Solbert, Chief, Special Services Division, ETOUSA, 11 Nov. 1944.

would circulate lists of items to be stocked for confirmation by the respective consultants. Sometimes substitutions or deletions were suggested. For example, on 25 April 1944, the Supply Division suggested that Nembutal (pentobarbital sodium) be substituted for Sodium Amytal (amobarbital sodium). Colonel Thompson had to disapprove the proposal on the basis that indications differed for the use of the two drugs, and Sodium Amytal was the drug of choice in many psychiatric conditions.

Throughout most of the life of the theater, electrical machines for shock therapy and for electroencephalography were in critically short supply. Initially, three electric-shock machines were borrowed from the British. In January 1943, Colonel Thompson discovered that the 5th General Hospital had had an electroencephalographic machine but was forced to leave it in the Zone of Interior owing to shipping priorities. It was alleged that lack of shipping space was also preventing the receipt of electric shock apparatus. When it was learned that funds were available at the 5th General Hospital for the purchase of an electroencephalographic machine, Colonel Thompson visited the Bruden Neurological Institute at Bristol, England, and was ultimately able to procure one British-made machine.

Colonel Thompson brought this situation of shortages to Colonel Menninger's attention by letter on 2 May 1944 "* * * because I thought that you might be helpful if the requests come through your office." Colonel Thompson was astonished at the reply, dated 10 May 1944, which read: "To my knowledge we haven't had any official request for such and you might check on that." By July 1944, the Supply Division, Office of the Chief Surgeon, Headquarters, ETOUSA, had informed Colonel Thompson that a "fair number" of electric-shock machines were on their way. It was not until Colonel Thompson returned from his temporary duty to the United States that a specialist in electroencephalographic techniques and electric-shock treatment from the Surgeon General's Office came to the theater and worked out details for supplying such machines and requirements for the personnel to run them. Finally, an additional supply of electric-shock apparatus arrived from the Zone of Interior in early 1945.

A request submitted by Colonel Thompson in March 1945 for psychologic tests, answer sheets, and scoring keys also was largely unfulfilled. As of the first of June 1945, the only materials that had arrived were Army General Classification Tests which were already in the theater; 50 sets of Rorschach cards, which were procured directly from Switzerland; and 25 sets of Thematic Apperception Test pictures. More important tests, such as the Wechsler-Bellevue Intelligence Scale and the Minnesota Multiphasic Personality Inventory, were not forthcoming. Those tests that were made available had to be provided on a priority basis to units scheduled for redeployment to the Pacific area.

Within the armies, neither the division psychiatrists nor units used as exhaustion centers had been provided the additional or special equipment needed to cope with the number of neuropsychiatric casualties encountered.

This was particularly true of the division psychiatrist. He required facilities capable of holding and caring for some 150 casualties, but tables of organization and equipment made no provision for this, and local arrangements had to be made to obtain the equipment. Such arrangements were best made where command surgeons and other staff officers had sympathetic understanding of the need for neuropsychiatric facilities. Colonel Thompson devoted much effort toward this end on his visits to the armies, corps, and divisions. Eventually, most division psychiatrists were routinely supplied with such essential medical items as reflex hammers and ophthalmoscopes. The only means of definitely solving these problems, however, was by new tables of organization and equipment or modifications of existing tables.

Professional Publications, Meetings, and Societies

Professional literature was always in demand, particularly by Colonel Thompson and the school. Through the courtesy of Dr. C. C. Burlingame, Colonel Thompson was able to obtain sufficient copies of abstracts published by the Institute of Living, Hartford, Conn., for his use and for use in classes in neuropsychiatry. A request submitted to Colonel Menninger for reports made by the Morale Service and publications of the Josiah Macy, Jr., Foundation was equally productive. Eventually, provision was made by The Surgeon General to supply all division psychiatrists with a full file of reports published by the Morale Service entitled "What the Soldier Thinks." In addition, a basic set of reference texts was provided each division psychiatrist. Many individual officers subscribed to various professional journals. Some subordinate consultants in neuropsychiatry also procured publications for their commands.

The Editorial Board, Office of the Chief Surgeon, Headquarters, ETOUSA, was established on 21 October 1944 by Office Memorandum No. 23. Colonel Thompson was appointed as one of its members. The board was required to review manuscripts of papers to be presented for publication or to be read before a society which published such papers in its journal. As a result, Colonel Thompson personally read, reviewed, and commented on the many papers touching upon the subject of neuropsychiatry that were submitted to the board. In conjunction with the Public Relations Officer, Office of the Chief Surgeon, Headquarters, ETOUSA, Colonel Thompson was required to advise and comment on stories by reporters in the theater on the subject of neuropsychiatry.

Meetings of various societies and organizations provided opportunities to exchange information and meet coworkers. They created a general feeling of cooperation and good will among all those attending.

The theater senior consultant in neuropsychiatry and psychiatrists in the field participated in the activities and meetings of all the larger organizations, such as the Inter-Allied Conference on War Medicine, the European Theater American Medical Society, and the various base section medical societies (fig. 132). Papers concerning neuropsychiatry presented by Colonel Thompson at



FIGURE 132. Col. Lloyd J. Thompson, MC, meets with distinguished neuropsychiatric consultants at the Inter-Allied Consultants Conference, 108th General Hospital, Paris, France, 15 October 1944. Left to right, Col. Lloyd J. Thompson, MC, Chief Consultant in Neuropsychiatry, ETOUSA; Lt. Col. Roscoe W. Cavell, MC, Consultant in Neuropsychiatry, Ninth U.S. Army; Lt. Col. William E. Srodes, MC, Consultant in Neuropsychiatry, First U.S. Army; Maj. Ellis Bonnell, MC, Neuropsychiatric Service, 108th General Hospital; Maj. Alfred O. Ludwig, MC, Consultant in Neuropsychiatry, Seventh U.S. Army; Col. William A. Merninger, MC, Consultant in Neuropsychiatry to The Surgeon General, and Lt. Col. Frederick R. Hanson, MC, Chief Consultant in Neuropsychiatry, MTOUSA.

the Inter-Allied Conferences on War Medicine were reproduced in the postwar publication of that organization.⁹⁰

On 13 February 1943, a meeting of the U.S. Army psychiatrists was held at the Royal Society of Medicine in London. In addition to the heads of psychiatric sections of general hospitals and the Senior Consultant in Neuropsychiatry, ETOUSA, there were present the Consulting Psychiatrist for the Royal Canadian Army Medical Corps; a representative of the Consulting Psychiatrist of the Royal Army Medical Corps; the Chief Consultant in Medicine, ETOUSA; and the Commanding Officer, the 36th Station Hospital. Colonel Thompson presided, and each psychiatrist presented a paper on some aspect of psychiatric services in this theater.

The three British services—Army, Navy, and Air Force—along with the Canadian forces had an informal organization of psychiatrists which met every

⁹⁰ See footnote 6, p. 258.

3 months. At first, Colonel Thompson was the only U.S. Army representative at its gatherings, but, in November 1943, all U.S. Army and Navy neuropsychiatrists were invited to join, and the organization became essentially a psychiatric association of the Allied Armies in Europe. Its meetings, which were commonly referred to as the interservices meeting of psychiatrists, were held at the Royal Society of Medicine in London. One of the high points in these gatherings was the session of 25 March 1944 devoted to rehabilitation work. At this meeting, Colonel Parsons explained in detail the rehabilitation program that was being carried out at the 312th Station Hospital.

In addition, Colonel Thompson represented the U.S. Army at the special Psychological and Psychiatric Liaison Committee meetings held at the offices of the War Cabinet in London; at conferences of command psychiatrists of the British forces; at conferences of the British Emergency Medical Service psychiatrists; and at meetings of the Services Subcommittee of the War Cabinet's Expert Committee on the Work of Psychologists and Psychiatrists. The latter was an extremely important association for Colonel Thompson, since the Services Subcommittee consisted of consulting psychiatrists and psychologists from all the British services.

Cooperation From Without the European Theater

This account would be incomplete if it were limited to dealings with strictly medical elements and individuals within the theater. The job that was done, and done with a conspicuous degree of success, would never have been possible without outside help.

Colonel Thompson was fortunate in having and maintaining frequent direct contact with the Neuropsychiatry Consultants Division, Office of the Surgeon General. The benefits were mutual and extended into all spheres of military neuropsychiatric activities. At first, contact was infrequent and relatively formal through approved military channels and by military letter, and these continued to be used for matters of importance requiring official cognizance, particularly policy matters. However, the way was opened for informal and personal communication in mid-1943.

On 1 June 1943, Colonel Halloran wrote Colonel Thompson as follows:

Until recently it was necessary for all communications from overseas consultants to pass through official channels. However, we have now received information that overseas consultants in the field should be encouraged to communicate with this office personally at least once a month. In this way we may be able to familiarize ourselves with many problems and receive information which will guide us in formulating advisory policies.

In reply to this letter, Colonel Thompson wrote: "It is a great relief to know that overseas consultants can communicate personally and directly with your office. In the past I have had considerable material which I thought would be of interest and value to you."

When Colonel Menninger became Chief, Neuropsychiatry Consultants Division, Office of the Surgeon General, in December 1943, the relationship established by his predecessor was continued. On 25 January 1944, Colonel Menninger wrote Colonel Thompson, as follows:

My stay in this office has been so short that I am still a long way from being oriented. I do have a very definite impression, however, that the lines of communication between us here and you over there have been very thin. I would like so much to know the dope from you and I presume you will be interested in knowing of events which occur around here. I'm going to try to get out a letter to consultants each two or three weeks just to let you know what we are doing and what is happening. I know that even in this country I felt very much isolated from The Surgeon General's Office and we do want to be of as much help to you as we possibly can.

A few months later, Colonel Menninger was still intent on establishing personal communications with Colonel Thompson on a sound and continuing basis, and on 22 March 1944, he wrote: "I am keen to know what's going on over there and any suggestions you have for me * * *. So much of our work is necessarily extremely interlaced with yours and it's a very great handicap for both of us that we don't know more of the details of each other's planning."

In September 1944, Colonel Menninger visited the European theater. Organizations in the combat zone were the primary goals in his itinerary. Accompanied by Colonel Thompson, he visited army and division psychiatrists and inspected evacuation hospitals, field hospitals, exhaustion centers, and clearing stations of many divisions on the line. Colonel Menninger then viewed neuropsychiatric work in fixed hospitals with particular attention to problems at the 130th General Hospital and the screening of patients from Quartermaster work units at the 19th General Hospital. Wherever he went, there were informal conferences with neuropsychiatrists in the field and direct exchange of opinions, ideas, and information.

In the United Kingdom, Colonels Menninger and Thompson were escorted by Brigadier Rees and Lt. Col. George R. Hargreaves on a grand tour of British military and civilian neuropsychiatric facilities. Among the installations visited were the Army Selection Training Unit (Royal Army) at Leeds, England, the Royal Army Medical Corps neurosis hospital at Bellsdyke, a primary training wing in the Scottish Command where the process of testing and placing recent inductees was observed, and "Gordenburn," the neurosis hospital of the University of Edinburgh. While in the field commands of the British Army, the visitors took part in a meeting at York, England, of British Army regional psychiatrists of the Northern Command. Two of the talks at this conference were given by the U.S. Army representatives, Colonels Menninger and Thompson. A meeting sponsored by Dr. David K. Henderson, Professor of Psychiatry, University of Edinburgh, was held with civilian psychiatrists in the vicinity of the university. A visit was paid Maj. Gen. J. A. Manifold, Surgeon, Scottish Command. Finally, Colonel Menninger attended a series of conferences arranged by the British in London.

Upon his return to the United States, Colonel Menninger wrote a complete account of his trip to the European theater.⁶¹ In this report he commented:

Visits From The Surgeon General's Office

My impressions in contacts with the professional consultants in the theater, and particularly with the medical officers in the hospitals, are that my visit was very much appreciated because it indicated an interest on the part of The Surgeon General in their situation. I believe it was an indication of the need for and value of rather frequent contacts between the professional group in The Surgeon General's Office and the professional group in the field.

In December 1944, Colonel Thompson returned to the United States for a period of temporary duty, from 12 December 1944 to 15 January 1945. While in the United States, Colonel Thompson presented the major address on combat exhaustion before the Research Association in Nervous and Mental Diseases, and acted as a member of the commission of the organization. Colonel Thompson spent some time at Mason General Hospital on Long Island, New York, where neuropsychiatric cases evacuated from all theaters were to be seen, and at the neuropsychiatric convalescent facility at Camp Upton. He attended the first conference of psychiatrists in charge of consultation services at replacement training centers, which was held at Aberdeen Proving Ground. There was much to discuss, and many plans and special arrangements were made at the Neuropsychiatry Consultants Division, Office of The Surgeon General.

There were other visits to the European theater from personnel of the Surgeon General's Office, representatives from other War Department agencies, and from the Office of Scientific Research and Development and National Research Council. All of these visits, either directly or indirectly, eventually had profound effect on the conduct of neuropsychiatric services in the European theater and the Army at large.

The first of these other visits was made in March 1944 by a group headed by Maj. Gen. Norman T. Kirk, The Surgeon General of the Army. He was accompanied by Maj. Gen. David N. Grant, the Air Surgeon, and Dr. Strecker. Dr. Strecker was a member of the special war committee appointed by the American Psychiatric Association, the president of the association, and a civilian consultant in psychiatry to the Secretary of War. He was concerned, primarily, with neuroses affecting combat aircrews. Brig. Gen. Malcolm C. Grow, Col. Elliott C. Cutler, MC, Lt. Col. (later Col.) Herbert B. Wright, MC, Col. R. B. Hill, MC, and Colonel Thompson joined the commission in its visits to field installations (fig. 133). Practically all general and station hospitals in England serving Army Air Force units were visited. Dr. Strecker interviewed personally many flying personnel who were patients. At all these installations, there were conferences with the psychiatrists. Of particular interest to the visitors was the rehabilitation center of the 307th Station Hospital, which was doing an exceptional job in returning wounded aircrew

⁶¹ See footnote 57, p. 366.



FIGURE 133. Stanbridge Earls, Hampshire, England, rest home for officers suffering from flying fatigue.

personnel to duty, and the 347th Station Hospital, which was the special treatment center for operational fatigue of flying personnel. A highlight of the tour was the visit by the entire commission to the 312th Station Hospital where the treatment and rehabilitation of nonpsychotic patients was seen. Medical officers attending the school of neuropsychiatry were engaged in conference, and a complete presentation was given by the school's demonstration unit of what the neuropsychiatrist might encounter at a casualty clearing station. On 20 March 1944, an evening dinner was given by Col. Rex L. Diveley, MC, Senior Consultant in Orthopedic Surgery, ETOUSA, and Colonel Thompson for members of the commission and their opposite numbers in consultation in orthopedics and psychiatry from the British services.

Some time after the visit of this commission, Colonel Thompson wrote to Colonel Menninger on 2 May 1944 and expressed the hope that Dr. Strecker had been able to call on him to tell about the visit in the European theater. "I am sure," Colonel Thompson ventured to say, "that he brought back with him considerable first hand information that cannot be expressed in writing." In a reply dated 10 May 1944, Colonel Menninger wrote in confirmation: "Ed Strecker did stop to see us and told us in considerable detail about the situation. The official reports come through more slowly."

Colonel Thompson had to decline a proposal by Dr. Strecker for holding examinations of the American Board of Neurology and Psychiatry in the European theater, desirable as this would have been. Colonel Thompson had

indeed received more than a few applications and queries regarding such examinations but it would have been too difficult to find the time and place for them at that time, when the invasion of the Continent was just 1 month old.

Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General, visited the European and Mediterranean theaters in March of 1945. General Morgan was not interested in neuropsychiatric activities per se, but his broad interests and extensive visits to units within each of the field armies in combat brought out many observations and interviews with key personnel. General Morgan was able to assess keenly the types of medical units being used, the missions they were performing, and their capabilities and limitations. In a memorandum dated 19 April 1945, he reported the results in detail to the Chief, Operations Division, Office of the Surgeon General.

Colonel Thompson spent the entire month of April 1945 with a special commission sent to the European theater to study psychoneurotics. The commission consisted of Col. Lucius A. Salisbury, MC, IGD; Col. Peter Schmick, GSC; Lt. Col. Herbert O. Peet, IGD; Colonel Everts; and Lt. Col. Walter O. Klingman, MC. In the latter part of 1944, a commission made up of Colonel Salisbury and four civilian psychiatrists had conducted a study of the treatment of psychoneurotics being carried out in the Zone of Interior. As a result, the Secretary of War asked the Inspector General for a report on the same topic from the theaters. One commission was sent to the Pacific area, and this one had come to Europe and was to proceed later to the Mediterranean theater.

Two days were spent in orienting the group and planning the itinerary. The first day of the tour was spent in long conferences with General Kenner at Supreme Headquarters, Allied Expeditionary Force, and with Col. (later Maj. Gen.) Alvin L. Gorby, MC, and Colonel Whayne, both of the 12th Army Group. From there, each army in combat was visited; that is, the First, Third, Seventh, and Ninth U.S. Armies. In each army, medical as well as other personnel were interviewed at all echelons from army and corps headquarters down to units within the divisions. In this way, opinions were obtained from commanders of major organizations, various staff sections, and medical officers. Every type of medical treatment facility in use was observed from division clearing stations back to exhaustion centers supporting evacuation hospitals. Early in the tour, the 51st Station Hospital, which was a specialized unit supporting Third and Seventh U.S. Armies, was inspected thoroughly. After the tour through the armies, a similar thorough study was made of the 130th General Hospital and its rehabilitation center, which was the terminus of neuropsychiatric evacuation from First and Ninth U.S. Armies.

Facilities and medical staffs of Eighth and Ninth Air Forces were also visited, including the rest homes of Eighth Air Force in the United Kingdom and the bomber field at Polebrook. While in the British Isles, the group made a complete study of treatment of neuroses as conducted at the 312th Station

Hospital—the “last ditch” rehabilitation center for neurotic patients in the theater. The 96th General Hospital, the holding center for psychotic patients, was also observed.

The work by this group during April 1945 was the most comprehensive on-the-spot assessment possible at that time. It included all facets of the whole problem—command and medical—as it pertained to psychoneurosis in the European theater. The seriousness and interest with which the members of the group proceeded about their work proved to be a real stimulus wherever they went. The following excerpt from a letter written on 25 April 1945 by Maj. Alfred O. Ludwig, MC, Consultant in Neuropsychiatry, Seventh U.S. Army, to Colonel Menninger, shortly after the visit of this group to his area, illustrates this feeling:

I had the pleasure of meeting Lt. Col. Everts when he visited us with the most recent of the many investigating committees that have “looked into” our affairs in the past two years. He, of course, was thoroughly familiar with what we have been trying to do, as well as with the various circumstances that influence the NP rates over here, but it was with very considerable satisfaction that I expounded some of our ideas to the other non-medical gentlemen. We tried to give them a very frank opinion, backed with facts and figures, as to the reasons for the situation, and emphasized particularly some of the things over which the medical department has no control.

On 21 April 1945, another commission arrived in the European theater from the Zone of Interior, made up of civilian consultants in neuropsychiatry to The Surgeon General. Its overall mission was to study the psychodynamics of combat exhaustion. The commission was composed of Drs. Leo H. Bartemeier, chairman, and John Romano, Karl Menninger, John C. Whitehorn, and Lawrence S. Fable. Its *raison d'être* was the fact that the clinical manifestations of psychoneurosis in combat differed considerably from typical psychoneurotic reactions, and, as the clinical picture changed more or less rapidly as the patient was evacuated to the rear, reliable information was needed for correlating psychopathology in forward areas with subsequent treatment methods. It was assumed that psychiatrists in the Army, and particularly the group at the lower echelons, did not have time and might not be professionally equipped to undertake such research. The contemplated project had the complete approval of the Office of Scientific Research and Development and was strongly endorsed by Brig. Gen. William A. Borden, New Developments, War Department. Earlier during the year, when The Surgeon General approached General Hawley on the feasibility of the project, an invitation was extended by General Hawley for a commission of this nature to be sent to the European theater.

The commission had intended to proceed in pairs or individually to different active fronts. However, the collapse of German resistance in many areas militated against such a plan. Colonel Thompson advised the members of the group to travel together. Because he was engaged in touring with the group headed by Colonel Salisbury, Colonel Thompson obtained the services of Colonel Parsons to escort them. The civilian commission covered practically

the same ground as the earlier commission, but its members were able to spend much more time at the 130th General Hospital and with British neuropsychiatrists. Unfortunately for the commission, there were almost no new battle casualties.

A complete report was made by the commission upon its return, in which it noted the peculiar advantage it had in dealing with military neuropsychiatric patients.⁶²

Being civilians facilitated the obtaining of information from some patients. It also enabled us to identify ourselves very readily with either privates or officers . . . because we were not, in fact, in any one of these positions ourselves . . . We were not under any compulsion or obligation to find ways of getting men back to duty. It was our function only to study the conditions without the necessity of serving any utilitarian purpose by which Army doctors are always bound and constrained.

If any one individual outside the European theater left a permanent mark upon the theater's neuropsychiatric activities, that person was Colonel Hanson, Consultant in Neuropsychiatry, NATOUSA (MTOUSA). Even before Colonel Thompson's arrival in the theater, when Colonel Hanson had been assigned to the North Ireland Base Section, ETOUSA, he had written a letter to the Chief Surgeon, ETOUSA, on 10 August 1942 citing the need for a much better organized, equipped, and extensive neuropsychiatric service in the European theater. The letter so impressed General Hawley that he had used it as the basis for requesting a full-time neuropsychiatric consultant of suitable high caliber to organize and operate such a program as proposed by then Captain Hanson.⁶³

It has been mentioned previously that, before departing for the North African theater, Colonel Hanson, with Colonel Thompson, had worked out a plan to be used in combat that was amazing in its foresight. When the European theater was in the process of making firm plans for mounting the invasion of the European Continent, Colonel Hanson had accompanied Colonel Thompson back to Europe from North Africa and helped sell the basic system, which was ultimately used in all field armies in Europe. At the same time, he gave lectures to students at the school of neuropsychiatry that were most acute and timely. His reports, verbal and written, were the basis for a significant part of the indoctrination of line medical officers and neuropsychiatrists in mobile hospital units at the school of neuropsychiatry.

When Colonel Menninger visited the theater, Colonel Hanson was able to join him with Colonel Thompson and make the visit more fruitful, both in terms of what Colonel Menninger was able to find out on his trip and the immediate benefit of the trip to neuropsychiatrists in field units with whom conferences were held. Forms devised by Colonel Hanson were used with but

⁶² Report of Psychiatric Mission, Office of Scientific Research and Development, European Theater of Operations, 16 April 1945-16 July 1945.

⁶³ Letter, Col. Paul R. Hawley, Chief Surgeon, ETOUSA, to Surgeon General, U.S. Army, 15 Aug. 1942, subject: Neuropsychiatric Treatment in the Theater of Operations.

slight modifications in the European theater. When Colonel Thompson was asked to recommend tables of organization and equipment for division psychiatrists, hospitals to be used as exhaustion centers, and special general hospitals for neuropsychiatrists, he found it good practice to ask for Colonel Hanson's advice with respect to these matters.

An indication of the regard which Colonel Thompson had for Colonel Hanson may be found in the following letter which Colonel Thompson wrote to Colonel Hanson on 24 February 1944, after Colonel Hanson's first return visit to the European theater:

I should have written to you before this time to thank you for all the help which you gave psychiatry in this theater. The men at our N.P. hospitals are still talking about your visit and the good your talks did for the personnel. You certainly did help getting things over to Colonel Spruit, and the plans which we made with him are going forward in spite of the fact that he recently moved on to another assignment.

Following Colonel Hanson's second visit to the European theater, Colonel Thompson wrote, on 11 November 1944: "Once more let me say that your visit in this theater was extremely helpful and stimulating. We all look to you as the pioneer in things that we are now trying to do."

In concluding this section, the aid given by the British forces, the Morale Services of Army Service Forces, and the Adjutant General's Office should be mentioned. Their contributions have been described in other parts of this survey. Colonel Thompson, in turn, found occasion to give advice and counsel to consultants in neuropsychiatry from the other Allied nations. The London office of the Rockefeller Foundation always maintained an enlightened and active interest in neuropsychiatric educational activities of the theater. The Josiah Macy, Jr., Foundation and the Institute of Living were always helpful in providing much needed literature.

Finally, another passage from the report of the commission headed by Doctor Bartemeier may be quoted here, for it summarizes the singular effectiveness of the arduous task of saving manpower and relieving neuropsychiatric losses as it was carried out in ETOUSA.⁶⁴ The report reads:

Among the most recent statistics which the commission have were those presented by Col. Lloyd J. Thompson, and Col. W. S. Middleton, at a meeting with Maj. Gen. Paul R. Hawley, the Chief Surgeon, and his consultants in Paris on 24 May 1945. The commission attended this meeting and learned that 17 percent of those casualties in the ETO who were returned to the Zone of Interior were suffering from neuropsychiatric disabilities. (This is in contrast to figures of 42 percent said to have been reported from other theaters.) The commission also learned that 80 percent of all N.P. cases in ETOUSA have been returned to various kinds of military duty. Perhaps even more dramatic was the report from one of the special U.S. military hospitals to the effect that 5,000 men were returned to some kind of military duty from this installation during the period of one year. If these thousands had not been treated they would have presumably been lost to the theater and would have returned home chronically ill. It is the opinion of the commission that this report is a high tribute to the effective work of army psychiatrists.

⁶⁴ See footnote 62, p. 392.

SUMMARY IN RETROSPECT

Lloyd J. Thompson, M.D.

Perhaps the Senior Consultant in Neuropsychiatry, ETOUSA, should have been a chief consultant on a level with the Chief Consultants in Medicine and Surgery, ETOUSA. Such an arrangement would have been in keeping with the situation that existed in the Office of the Surgeon General. However, at no time during my 3 years in the European theater was there any difficulty in working "under" Colonel Middleton. In fact, on numerous occasions there were distinct advantages and always I had the feeling of working "with" Colonel Middleton. With other personalities this might not have been true.

I want to express again my great appreciation of the generous help and loyal cooperation given by Brigadier Rees of the Royal Army Medical Corps, Colonel van Nostrand of the Royal Canadian Army Medical Corps, and by their fellow officers throughout the war in Europe. In my first contact with Colonel Middleton I suggested that psychiatry should be concerned with prevention and the earliest possible treatment and should not wait for psychiatric casualties to be admitted to general hospitals. I soon found that the English and Canadian psychiatrists had been applying this idea since the beginning of the war.

My appreciation of the loyal and prodigious assistance given by the numerous neuropsychiatrists in our own army was expressed verbally and individually long ago but should be recorded here.

The first great surprise and challenge that came after reporting for duty in August 1942 was the discovery that the position of division psychiatrist had been dropped from the table of organization some years previously. Having known several of the division psychiatrists of World War I and having heard their accounts, it seemed that this position would still be a key one, although the type of warfare had changed. Looking back on subsequent experiences, I feel certain that each division could have used two psychiatrists to great advantage. Of course, there was not the quantity of trained personnel to permit even an experiment in this direction.

Originally it was thought that when necessary, division neuropsychiatric casualties would be evacuated from the clearing stations to evacuation hospitals. Apparently, this was standard operating procedure. However, at this level a great deal of experimenting was done. The First U.S. Army pioneered (on the basis of experience in North Africa and Italy) in establishing exhaustion centers manned mostly by psychiatrists from the evacuation hospitals. In contrast, the Third U.S. Army kept psychiatric services in its evacuation hospitals, but established in one convalescent hospital a holding and treatment center for neuropsychiatric patients. There were still other modifications of service at this level and arguments concerning the best plan may still be going on. At the end of the war, it appeared that the Third U.S. Army plan had been best for its particular type of combat in its sweep from Normandy into Germany. In the First U.S. Army, as well as in the other armies where exhaustion centers

were established, their plan worked equally well and seemed suited to their functions.

The establishment of the specialized neuropsychiatric hospitals just back of army areas, with their emphasis on rehabilitation, certainly had strong support from General Hawley regardless of opposition from other sources. The plan to have such a rehabilitation center just back of the First and Ninth U.S. Armies and another just back of the Third and Seventh U.S. Armies seemed logical. Because of delay in establishing these centers and because of their use for other purposes, the plan never came to full fruition. On the other hand, the specialized neuropsychiatric hospitals in England fulfilled their functions beyond expectation. While speaking of these neuropsychiatric hospitals, the brave action of Colonel Parsons, commanding officer of the 130th General Hospital, during the Battle of the Bulge should be recorded again and again. He remained behind as the only medical officer with patients who could not be evacuated while the German Army swept by and beyond his hospital.

Having these separate neuropsychiatric units—exhaustion centers within the armies, rehabilitation hospitals just back of army areas as well as in England, and at the same time, adequate psychiatric services in evacuation, general, and even station hospitals—may have seemed like “having your cake and eating it, too.” Considering the magnitude of the psychiatric problems as well as the results obtained, this apparent overlapping seems to have been necessary.

Psychiatric participation in organizations outside of Medical Department activities, such as replacement depots, and disciplinary centers was a much needed function that was fulfilled in a somewhat makeshift manner. Most of these functions had to be “sold” and when “bought” the lack of psychiatric personnel as well as of command backing often produced embarrassing situations.

The formation of units for hard labor came as a surprise to psychiatrists and perhaps to the majority of medical officers. Who was to decide just which combat-exhaustion soldiers should be assigned to labor battalions and which should be treated as casualties and receive psychiatric care remained an open question. This unanswered question is of tremendous importance in all branches of the services and at all times. The answer lies not only in the moral fiber of the individual but in the atmosphere of morale, leadership, and motivation that surrounds the individual from the time of induction until signs of breakdown appear. In respect to this question, psychiatrists were often considered as being too soft. At times and under certain individual circumstances, such may have been the case. Generally speaking, however, we attempted to steer a common-sense middle course.

The part played by the theater school of neuropsychiatry and other educational efforts is worthy of further commendation. The numerous division psychiatrists, frontline medical officers, and many others who received indoctrination at the school were responsible for enhancing the success of the neuropsychiatric program. The accomplishments of Major Thomas and later Major Fabing in carrying out the mission of the school were far beyond expecta-

tions. They were ably assisted by other psychiatrists, but I shall not list their names for fear of slighting someone by an inadvertent omission.

It remains my conviction that an assistant in the office of the theater senior consultant in neuropsychiatry could have been used to great advantage. An assistant in neurology was asked for, anticipating that this might be a neuropsychiatrist who would have adequate knowledge about neurology, electroencephalography, hospital organization, physical therapies, and even clinical psychology. Such an assistant could have carried on many functions while the senior consultant was out of the office.

My visits to North Africa, from 13 November to 21 December 1943, and to the United States, from 12 December 1944 to 15 January 1945, were surely essential. Visitors coming into the theater contributed immeasurably to the neuropsychiatric and other programs, but it is to be recognized, without detracting from their valued assistance, that time had to be spent with them. The Surgeon General of the Army and the Air Surgeon, accompanied by Dr. Strecker, were present during March 1944. Colonel Menninger arrived in September 1944 for a tour of duty lasting about 6 weeks. His visit gave impetus to many sagging operations and started new ones. A group of visiting officers under Colonel Salisbury came early in April 1945 to study the functions of neuropsychiatry in the European theater. Their thorough investigations were extremely helpful. Before these visitors had departed, another group of civilian psychiatrists under Dr. Leo Bartemeier came for further studies. The latter group remained until 4 July 1945. Later, they produced a very valuable and well documented report on many aspects of neuropsychiatry in the European theater.

The foregoing account concerning visits and visitors has been given mainly to record the great value received from those who came and stayed to help, as they did, but the account seems to indicate also that the senior consultant needed an assistant in his office.

Acknowledging the betterment of neuropsychiatric services during the war in Korea but hoping that another war will never occur, wherein our examples will again have to be referred to, I want to close this brief personal summary by expressing thanks to and admiration for my immediate superior officers, Colonel Middleton, Colonel Kimbrough, and General Hawley.

Part IV. Senior Consultants in Infectious Diseases and Tuberculosis, and Medical Consultation in Subordinate Commands⁶⁵

The preceding parts of this chapter first reviewed the overall medical consultant system in the European theater and continued with detailed dis-

⁶⁵ The narrative for this part was compiled by Maj. James K. Arima, MSC, The Historical Unit, U.S. Army Medical Service, in collaboration with Yale Kneeland, Jr., M.D., and Theodore L. Badger, M.D., former Senior Consultants in Infectious Diseases and Tuberculosis, ETOUSA, respectively. Drs. Kneeland and Badger contributed summaries in retrospect in mid-1956.



FIGURE 134. Consultants in medicine, European theater. (Left) Lt. Col. (later Col.) Yale Kneeland, Jr., MC, Senior Consultant in Infectious Diseases, Office of the Chief Surgeon, ETOUSA; Consultant in Medicine, Office of the Surgeon, Southern Base Section; and Consultant in Medicine, Office of the Surgeon, United Kingdom Base. (Right) Lt. Col. (later Col.) Theodore L. Badger, MC, Senior Consultant in Tuberculosis, Office of the Chief Surgeon, ETOUSA; and Consultant in Medicine, Office of the Surgeon, Normandy Base Section, ETOUSA.

cussions of the work of the two full-time Senior Consultants in Dermatology and Neuropsychiatry, ETOUSA. Almost all the others whether senior, base section, regional, or hospital center consultants held dual positions.

Col. Yale Kneeland, Jr., MC, Col. Theodore L. Badger, MC (fig. 134), and Col. Gordon E. Hein, MC, the Senior Consultants in Infectious Diseases, Tuberculosis, and Cardiology, ETOUSA, differed in the role each played to a limited degree among themselves and to a considerable degree from the two full-time theater senior consultants, Colonels Pillsbury and Thompson. As a group, they were more concerned with the investigation of specific problems and the establishing of theater policy in their respective fields of specialization, while overall operational and administrative functions were assumed by the Chief Consultant in Medicine, ETOUSA, Colonel Middleton. No regional or hospital center consultants were appointed in medical specialties other than dermatology and syphilology and neuropsychiatry. Supervision and consultation at hospital and field army level were accomplished by regional, hospital center, or army consultants in general medicine. The regional and, later, hospital center consultants were, in turn, supervised by base section medical

consultants, who, for a major part of the active life of the theater, were also the theater senior consultants in their specialties.

Finally, there were many medical officers with unusual talents assigned to specific projects or studies in conjunction with the solving of theater medical problems. Their participation in the theater's consultant activities must be mentioned to round out this account.

Accordingly, this final section of the history of medical consultants in the European theater will discuss the more significant medical problems in the context in which they occurred, except for those special fields already covered, in an endeavor to indicate the contribution of each consultant to the solution of a particular problem and to show in proper perspective the integrated functioning of the consultant system as a whole.

BUILDUP IN THE UNITED KINGDOM

Atypical Pneumonia

One of the first medical problems to strike the fledgling European theater was an increasing number of cases of atypical pneumonia in the early fall of 1942. At that time, the specific characteristics of the disease were far from common knowledge among members of the medical profession at large. It was only in the mid and late 1930's that atypical pneumonia had been recognized as a distinct entity with an unknown causative agent, which was definitely not a pneumococcus. In both England and the United States, the resistance of some pneumonias to sulfonamide therapy had emphasized this distinction. The Secretary of War, upon recommendation by The Surgeon General, had appointed a small civilian commission to study an epidemic of pneumonia at Camp Claiborne, La., in the summer of 1941. The commission concluded that the epidemic was one of atypical pneumonia. Following recommendations by this commission, The Surgeon General established the Commission on Acute Respiratory Diseases. As a result of preliminary studies by these bodies, the classification "Primary Atypical Pneumonia, Etiology Unknown" was added, for the first time in March 1942, to the list of diseases reportable on the weekly statistical health report.

In the fall of 1942, the disease was appearing in ever-increasing numbers in the European theater. Cases occurring at this time were often mild, and symptoms varied considerably. There were no specific diagnostic manifestations to make identification simple. In spite of the usually benign course of the disease, convalescence was relatively long, frequently requiring hospitalization for a month or more. Little was known of the residual effects of atypical pneumonia, and there was the possibility that some soldiers were being returned to duty without sufficient rehabilitation.

On 20 October 1942, Colonel Middleton wrote to Air Commodore Alan F. Rook, RAF, asking for information on British experience with the disease. On 22 October 1942, Colonel Middleton wrote to each of the medical officers

who were concerned with the diagnosis and treatment of atypical pneumonia in the theater's three general and two station hospitals.⁶⁶ He informed them of the incidence of atypical pneumonia in the five hospitals; told them of a survey being done by the Preventive Medicine Division with participation by the Professional Services Division, both in the Office of the Chief Surgeon, Headquarters, ETOUSA, and the assistance of the 3d Station Hospital; and concluded with the following:

Clinical, X-ray and laboratory observations must be accurately recorded to capitalize upon the current experience in the interests of better service to the soldiers. In the light of certain observations, it is suggested that X-rays of the chests of soldiers suffering from apparently mild respiratory infections be taken, particularly when they report from units in which atypical pneumonia has occurred. There is reason to believe that an appreciable percentage of these patients will show pneumonitis to the X-ray. This office will serve as a clearing house for such clinical experiences as you may wish to report.

By November 1942, the incidence of atypical pneumonia seemed to be reaching its peak. Medical officers at the hospitals continued to submit reports in reply to Colonel Middleton's letter of 22 October. On 21 November 1942, in a memorandum to General Hawley, Colonel Middleton recommended that a committee be appointed to coordinate and pursue the study of atypical pneumonia from its epidemiologic, clinical, and laboratory aspects, and suggested as members Colonel Kneeland, Colonel Gordon, and Major Muckenfuss. Colonel Kneeland was Chief, Medical Services, 2d General Hospital, and had been one of the members of the Secretary of War's special commission which had made the preliminary investigations at Camp Claibourne, La., in 1941. Colonel Gordon was Chief, Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA, and Major Muckenfuss, an experienced virologist, was Commanding Officer, General Medical Laboratory A.

General Hawley quickly approved the proposal, and Special Order No. 23 establishing the committee was published by the Office of the Chief Surgeon, Headquarters, ETOUSA, on 23 November 1942.

With Colonel Kneeland serving as president and chairman, Major Muckenfuss as the recorder, and Colonel Gordon as the third member, the committee met at General Medical Laboratory A on 12-13 December 1942. First, the committee decided that a circular letter should be prepared embodying material recently published in *War Medicine*⁶⁷ and directing that undue incidence should be reported directly to General Hawley's office. This directive was to be prepared by Colonel Gordon and to be published by General Hawley. Next, the committee considered the possibility of there being a change in clinical character of this disease and a greater influence of secondary infection in the days to come. Colonel Kneeland agreed to discuss with the necessary individuals the need to observe cases closely for such changes. Finally, it

⁶⁶ Letter, Lt. Col. Wm. S. Middleton, to Lt. Col. Yale Kneeland, 2d General Hospital, Lt. Col. T. H. Badger, 5th General Hospital, Lt. Col. Gordon E. Hein, 30th General Hospital, Maj. James R. May, 3d Station Hospital, and Capt. Sidney G. Page, Jr., 151st Station Hospital, 22 Oct. 1942, subject: Incidence of Atypical Pneumonia.

⁶⁷ Moore, G. B., Jr., Tannenbaum, A. J., and Smaha, T. G.: Atypical Pneumonia in an Army Camp. *War Med.* 2: 615, 1942.

was resolved that laboratory investigations directed towards identification of the etiologic agent should be governed by the general principle of doing only those things that could be carried out to advantage in a theater of operations, avoiding the intensive type of investigation that would duplicate studies under way by the special commission in the Zone of Interior. Direction of laboratory investigations on the disease in the European theater was the province of Major Muckenfuss.

The circular letter on atypical pneumonia was completed in December and published by the Office of the Chief Surgeon, Headquarters, ETOUSA, on 7 January 1943, as Circular Letter No. 2. It gave a brief history of the disease; noted prevailing epidemiologic factors; discussed clinical features, differential diagnosis, management of hospital cases, pathologic studies, and related virus infections; and closed with a paragraph on special reporting procedures. The medical officer responsible for the medical service of a company, or a detachment of similar size, was ordered to report directly to the Office of the Chief Surgeon, Headquarters, ETOUSA, by telephone the occurrence of three or more cases of primary atypical pneumonia within 1 week in the company or detachment concerned. Likewise, whenever a hospital admitted three or more cases in any one week from a company or detachment, the hospital commander was directed to report the fact by telephone directly to the Office of the Chief Surgeon, Headquarters, ETOUSA.

In the meanwhile, Lt. Col. Joseph C. Turner, MC, 2d General Hospital, had been assigned to Medical General Laboratory A to conduct laboratory studies on atypical pneumonia. By mid-February 1943, he had made a discovery that appeared to throw light on the immunology of the disease. On 16 February 1943, Colonel Kneeland wrote to Colonel Gordon as follows:

Thanks ever so much for your letter reporting on Atypical Pneumonia. The disease seems to have dried up here except for one very seriously ill officer—which is rather bad luck, for Joe Turner has just got hold of a serological change which, if it turns up in other cases of the disease, might be very interesting indeed. He's going over to the 2d Evac. tomorrow to get blood from their new cases, and if the thing looks promising he'll be very anxious for more material. Therefore, do you suppose you could let me know of any new cases you hear of, particularly severe ones?

In reply, Colonel Gordon was able to provide Colonel Kneeland immediately with "what is essentially a complete list of atypical pneumonia cases since Feb. 1st."

By the end of April 1943, Colonel Turner had gathered enough data to show with considerable reliability that there was an increase in cold agglutinins (autohemagglutinins) in patients convalescent from primary atypical pneumonia. The minutes of the 30 April 1943 meeting of the Chief Surgeon's Consultant Committee, record Colonel Middleton reporting as follows: "It has been shown that there is a development of cold agglutinins after one week of illness, with a building-up and then subsequent falling-off. The process is found in a few other conditions and may have wider ramifications and contribute to our knowledge of immunology." Colonel Turner was able to publish

his findings in a British publication ⁶⁸ at about the same time that the results of independent studies on the phenomenon were published in the United States.⁶⁹

The studies conducted in ETOUSA demonstrated again the place of research in a theater of operations during wartime. Soon after the results had been obtained, the technique of a cold-agglutinin test as a promising aid in the differential diagnosis of pneumonia was promulgated in the European theater.⁷⁰ Had this preliminary work not been done, months might have elapsed before the theater could have put the test to practical use, and, by that time, the invasion of the European Continent would have precluded any efficient trial of the method.

Prior to publication of the technique, the atypical pneumonia committee had met at the 1st Medical General Laboratory (fig. 135) on 19 September 1943 to consider the accumulated data on atypical pneumonia and to plan further studies, with Colonel Turner attending by invitation. The committee agreed to arrange for the collection of a large amount of data on the incidence of cases showing a rise in titer of cold agglutinins during the disease. The purpose was to obtain additional information as to the clinical value of the tests and also to accumulate records that might be used later in determining the incidence of second attacks. It was realized that there were no existing data on the question of immunity conferred by one attack of the disease. The conferees also suggested that another way to study active immunity would be to have medical officers make a special effort, in cases of atypical pneumonia, to determine by careful history taking whether the patient had ever had a previous attack. Finally, the committee suggested that the chiefs of medical services of hospitals be urged to keep the bacterial flora of the sputum from patients with atypical pneumonia under as close scrutiny as the hospital laboratory facilities would permit. It was considered important to bear constantly in mind the possibility of secondary bacterial infection and, in particular, to note any preponderant micro-organism.

In the spring of 1944, there was a sharp rise in the incidence of both atypical and lobar pneumonia without the rise in the common respiratory diseases or influenza such as commonly precedes an increased incidence of primary bacterial pneumonia. It was believed that much of the reported incidence of lobar pneumonia was due to a misdiagnosis of cases of primary atypical pneumonia. During March and April of 1944, the incidence of primary atypical pneumonia reached mild epidemic proportions but did not reach the peak of 1942. The disease always remained an important consideration in medical planning, however, because it did not have a seasonal distribution.

⁶⁸ Turner, J. C.: Development of Cold Agglutinins in Atypical Pneumonia. *Nature*, London 151:419, 1943.

⁶⁹ Peterson, O. L., Ham, T. H., and Finland, M.: Cold Agglutinins (Autohemagglutinins) in Primary Atypical Pneumonias. *Science* 97: 167, 1943.

⁷⁰ Letter, Office of the Chief Surgeon, Headquarters, ETOUSA, to surgeons of all base sections and commanding officers of all U.S. Army hospitals, 24 Nov. 1943, subject: Technique of Cold Agglutinin Test for Use in Differential Diagnosis of Pneumonia.



FIGURE 135. 1st Medical General Laboratory (foreground) and town of Salisbury, Wiltshire, England, 1944.

In the European theater, efforts to study atypical pneumonia contributed to increased efficiency in diagnosis and better care of the sick soldier. Considerable data were collected, but no important conclusions could be drawn during the war years. However, the studies conducted by the U.S. Army in the United Kingdom and the attention the Army gave to the disease probably contributed also to the increased interest and better understanding of atypical pneumonia on the part of British medicine, both military and civilian.

Tuberculosis

In World War I, rigid physical examinations of recruits had excluded from service some 50,000 men. Nevertheless, more than 2,000 men had died of tuberculosis in the Army, and the admission rate in Army hospitals had averaged 19 per 1,000 troops per year. Tuberculosis was the leading cause of discharge for disability because of disease.¹ In the period between the two wars, much had been learned about the pathogenesis of tuberculosis and much was done to establish the superiority of roentgenographic to physical examination for screening. In the Second World War, however, information available

¹ The Medical Department of the United States Army in the World War, Communicable and Other Diseases, Washington, U.S. Government Printing Office, 1928, Vol. IX.

in the European theater indicated that only 51 percent of recruits called to induction stations before March 1941 had been examined by X-ray and that large numbers had not been done up to January 1942. It was not until after Mobilization Regulations 1-9, dated 15 March 1942, were put into effect that routine roentgenograms were made of the chest of all inductees.⁷²

There was clearly need for an early assessment of the tuberculosis problem in the European theater. Accepting the recommendations of Colonel Middleton, General Hawley, on 2 January 1943, appointed Colonel Badger, Chief, Medical Service, 5th General Hospital, as Senior Consultant in Tuberculosis, ETOUSA.

Colonel Badger appraised the tuberculosis situation and, in a letter to Colonel Middleton on 8 February 1943, reported that the British Army was not using preenlistment X-ray screening. During the first 2 years of war, Colonel Badger found that 86 percent of tuberculosis in the British Army had appeared within the first year and 41 percent during the first month of active training. The British had considered using mobile X-ray units, but nothing had been done to implement their use as of February 1943, except in the Royal Air Force, which was screening all enlistments with 35-mm. fluorographic units. Wing Comdr. R. R. Trail, RAF, insisted that the procedure be supervised and run by medical officers with wide experience in clinical chest disease; there was also a radiologic adviser to each X-ray unit. Two very significant facts learned also by Colonel Badger were these: (1) Fresh milk in the United Kingdom was not being pasteurized, and 11 to 20 percent of fluid milk contained viable tubercle bacilli; and (2) manpower problems required the Royal Army to sort cases with very minimal lung lesions into those unfit for service, those fit for light work, and those fit for only sedentary jobs.

Colonel Badger reported that the Canadian Army, on the other hand, was examining all candidates by X-ray and was rejecting approximately 1 percent. A report by a Canadian Army medical officer in 1942 showed that, of 104 cases of tuberculosis which developed in personnel while they were in the Army, 92 percent occurred in soldiers with a negative preenlistment X-ray. The Canadians had attempted no mass X-ray surveys after original preenlistment screening, but contacts of open cases were being examined by X-ray, and active cases were being boarded back to Canada. Like the British, the Canadian Army studied small lesions at their general hospital in the United Kingdom and, wherever possible, reclassified for duty patients with such lesions.

In his report, Colonel Badger estimated that the tuberculosis hazards for U.S. Army troops would be as follows: (1) Early exacerbation of subclinical cases admitted to service without X-ray of the lungs; (2) association with unscreened British troops and civilians; (3) drinking of infected milk; (4) the effects of combat such as excessive fatigue, changes of nutrition with

⁷² (1) Long, E. R.: War and Tuberculosis. *Am. Rev. Tuberc.* 45: 616, 1942. (2) Long, E. R., and Jablon, S.: Tuberculosis in the Army of the United States in World War II—An Epidemiological Study with an Evaluation of X-ray Screening. Washington: U.S. Government Printing Office, 1955.

marked loss of weight, and malnutrition; and (5) the yet undetermined effects of intercurrent respiratory infection.

Colonel Badger reported these facts at the Chief Surgeon's Consultant Committee meeting of 5 February 1943. In addition, he reported a reversal in the ratio of pleurisy with effusion to parenchymal involvement as compared with the usual ratio found in civilians. Reliable data could only be obtained by spot surveys with fixed equipment already in medical installations. He indicated that surveys of field units that had been in the theater 1 year or more and of units that had only been in Europe 6 months would be desirable. Colonel Badger estimated that these surveys would involve 2,000 or more chest films.

When asked whether the use of microfilms was feasible, Colonel Badger replied that they were less accurate than full-sized films. General Hawley said that getting 2,000 or more people into a hospital for X-ray examination would dislocate training and other hospital activities. He agreed to the survey only if it could be done by going into camps with a mobile apparatus and using it, perhaps after supper, without causing any dislocation of the work and routine of troops. He suggested that the developing could be done at the nearest hospital during the day. Colonel Kimbrough, Chief, Professional Services Division in General Hawley's office, said that Lt. Col. (later Col.) Kenneth D. A. Allen, MC, Senior Consultant in Radiology, ETOUSA, and the Operations and Training Division, Office of the Chief Surgeon, Headquarters, ETOUSA, could work out a suitable portable apparatus. Colonel Cutler, the theater chief consultant in surgery, asked if a survey of hospital personnel would suffice, and Colonel Badger replied that he thought not; he himself, had in mind a survey of the 29th Infantry Division. General Hawley agreed that it would be profitable to screen such men as the labor troops and the engineers who had been working in the mud. Colonel Badger then specifically asked General Hawley if he (Colonel Badger) had the authority of General Hawley to obtain a portable apparatus and embark on the survey. General Hawley assented but said that before Colonel Badger went into any divisions, he (General Hawley) would first like to write to the division surgeons for concurrence.

Colonel Badger then raised the question of milk and food being provided U.S. troops by American Red Cross canteens, saying he had observed fresh cow's milk being served to troops (fig. 136). He recommended inspection of premises and employees wherever U.S. soldiers were served food. General Hawley said that he would take up the matter with the American Red Cross commissioner in Great Britain and would ask for some sort of sanitary control over the milk, foodhandlers, and sanitation in American Red Cross establishments.

There remained two problems to be settled before Colonel Badger could embark on his spot survey. One was the matter of obtaining permission to enter a unit to conduct the survey, and the second was the creation of a



FIGURE 136.—The Washington Club, premier American Red Cross club, London, July 1942.

mobile X-ray unit. Regarding the former, Colonel Middleton conferred further with Col. Oramel H. Stanley, MC, Deputy Surgeon, Headquarters, Services of Supply, ETOUSA, who thought it would be desirable to avoid official channels of communication on such a matter. In order to proceed with the survey, it was agreed that Colonel Badger should write to the surgeon of a major command or the commanding officer of a smaller unit, as appropriate to the case, and request permission to take chest X-rays for a tuberculosis survey which had been authorized by General Hawley. Colonel Stanley believed that General Hawley would approve this procedure, and General Hawley did approve it at a later date.

Colonel Middleton also asked Colonel Allen for guidance in assembling a portable X-ray unit and for advice in the technical aspects of taking, developing, and interpreting roentgenograms. Colonel Allen was more than willing to help since he hoped, in the future, to establish mobile field X-ray units himself. Colonel Badger embarked on the program in late February 1943. He met only the most cordial acceptance of his proposals for making

tuberculosis surveys in units. For example, Col. C. W. Brenn, MC, Surgeon, V Corps, wrote to Colonel Badger on 22 February 1943, as follows:

1. The Chief of Staff, V Corps (Reinf.) has granted authority for you to personally contact commanding officers of units where you wish to make X-ray and/or other surveys, and to make such arrangements as may be mutually acceptable.
2. It is suggested that you present a copy of this letter when first contacting a unit commander.

The mobile X-ray unit was quickly assembled using equipment and personnel available at the 5th General Hospital (fig. 137). Capt. (later Lt. Col.) Magnus I. Smedal, MC, Chief, X-ray Service, 5th General Hospital, took an active interest in setting up this equipment, and his help later in reading the X-rays was an indispensable contribution. The commanding officer, Colonel Keeler, gave the project his wholehearted support.

As eventually constituted at the 5th General Hospital, the mobile X-ray unit, which was composed of a standard Picker portable X-ray unit and a dark-field tent, was transported in a 1½ ton truck and set up in a vacant Nissen hut at the unit surveyed. The equipment, when packed, measured 67¼ cubic feet and weighed 1,663 pounds. One carryall was used to transport the team of 1 officer and 7 enlisted men. Of the latter, 1 was an X-ray operator; 2 were darkroom workers and plate changers; 1 functioned as the runner, cassette carrier, and truck driver; 1 prepared number strips; 1 positioned markers; and 1 was a noncommissioned officer who maintained records.

The unit was customarily set up and working within a hour after arrival. Chest films, 14 x 17 inches, were taken at the average rate of 90 an hour, including a 10-minute stop each hour to rest the team. The maximum number of X-rays taken per hour was 137. The team was carefully trained in the technique of rapid mass production and worked with great efficiency. All roentgenograms were developed at the 5th General Hospital and were interpreted there by Colonel Badger and Captain Smedal.⁷³

During the months of February and March 1943, a total of 2,542 persons was examined. Troops from fixed and field medical units, combat engineers, and the infantry made up the sample. In a letter dated 27 April 1943 to Colonel Middleton, Colonel Badger reported on the results of the survey and noted, as follows:

* * * The incidence of re-infection tuberculosis of 0.9 percent is not bad. I, of course, do not have the clinical check-up of all these cases, but repeated X-rays of not less than a month apart show either no changed parenchymal processes or by stereoscopic vision the lesions are revealed as dense fibro-calcific affairs.

Some of those about which I feel somewhat concerned I have carefully avoided calling "healed" lesions. I have requested a re-X-ray of the doubtful ones again in two months, and met with only the greatest co-operation and interest. My impression in regard to this problem at the moment has not changed from the recommendations which were submitted at the last meeting. If there is any question of movement in the 29th Division it may be wise to call in two of their men from strenuous field duty.

⁷³ Letter, Senior Consultant in Tuberculosis, to Chief Medical Consultant, ETOUSA, 17 Dec. 1943, subject: Annual Report of Division of Tuberculosis.

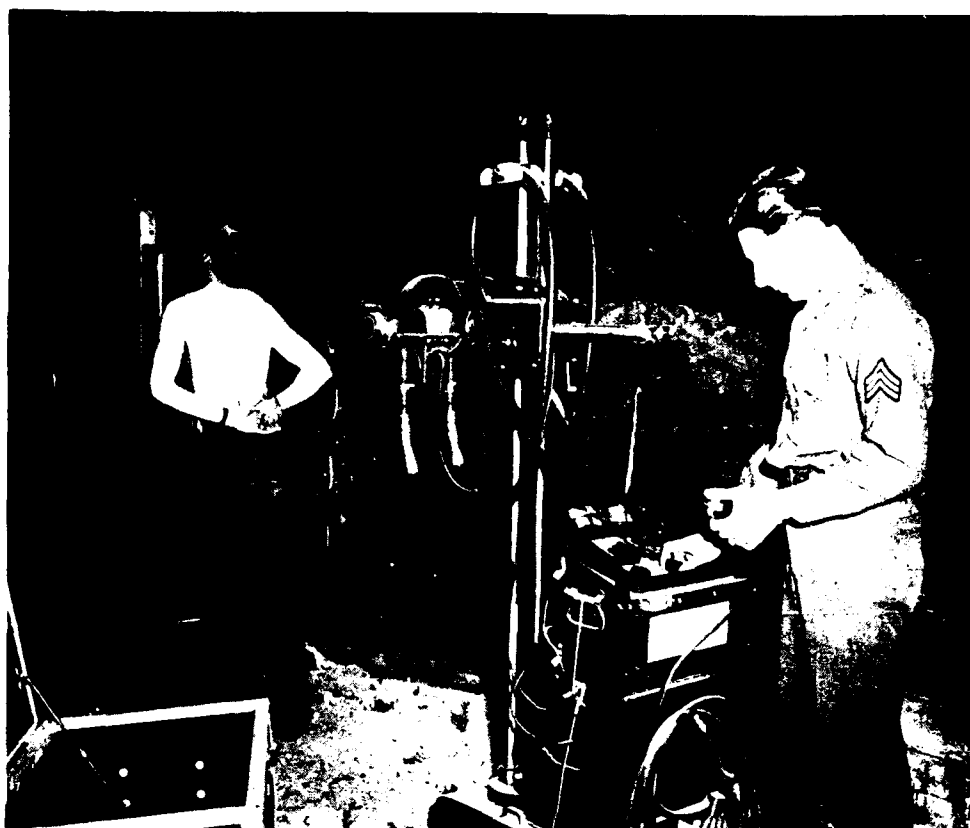


FIGURE 137. Demonstration of mobile X-ray unit assembled at 5th General Hospital.

I am planning to send to each of those units a report of the X-ray findings also so that they may be incorporated in their Service Records.

In his efforts to collect additional data on the tuberculosis situation, Colonel Badger sent out followup letters to the 112th and 342d Engineers, the 53d Medical Battalion, and the 115th Infantry, 29th Infantry Division, on suspected cases of tuberculosis. He also asked for and received, through the Medical Records Division, Office of the Chief Surgeon, Headquarters, ETOUSA, a table showing incidence of tuberculosis in the Iceland Base Command from 20 November 1942 to 9 April 1943. A survey of the 30th General Hospital was completed, and additional enlisted men from the 53d Medical Battalion and the 5th General Hospital were examined by X-ray to complete the survey of those units. Particular attention was given to the survey of nurses in the general hospitals because of their known accessibility to infection. Colonel Badger proposed a survey of nurses of the 10th Station Hospital, but Colonel Middleton disapproved this plan for reasons which clearly expressed the purpose and limits of the spot survey. On 20 March 1943, Colonel Middleton wrote to Colonel Badger, as follows:

With the completion of the survey of the nursing personnel of the 5th and 30th General Hospitals, you will have a total of 138 subjects, which figure represents over 10 percent of the Army Nursing Corps in this Theater. This ratio will be far higher than the general

group. Furthermore, the conditions surrounding the 10th Station Hospital nursing personnel are largely duplicated in the 5th General nursing group.

For these obvious reasons and the necessity of keeping this original spot survey within reasonable limits, the project to X-ray the 47 nurses of the 10th Station Hospital is disapproved.

As the problem is evolved on the completion of the initial spot survey, the over-all policy for the Theater will be evolved, so that no group will be neglected in the long run.

On 8 June 1943, Colonel Badger also arranged with the Medical Records Division in General Hawley's office to obtain information as to final diagnosis of hospital admissions in the European theater initially diagnosed as pleurisy, tuberculosis, hemoptysis, and spontaneous pneumothorax. Colonel Badger prepared a list of all patients on whom he wanted the information, giving the names of each, their diagnosis, and the hospitals to which they had been admitted.

When all these additional data were assembled and amalgamated with the original data, the total sample of officers, nurses, and enlisted men examined roentgenographically amounted to 3,031 cases (fig. 138). Of these, 2,143 (approximately 71 percent) had entirely negative X-ray films. Only 35 cases of reinfection tuberculosis were found (1.1 percent of the total). In April 1943 when Colonel Badger made his report to Colonel Middleton, the followup of these 35 lesions of reinfection was still being carried out, and final results were pending X-ray examination of units that had been on the move. Only 1 of these 35 cases was classified as minimal active tuberculosis, but it had not been necessary to remove any individual from duty because of X-ray findings. In addition to Captain Smedal, Capt. (later Maj.) Samuel P. Asper, Jr., MC, 5th General Hospital, had helped considerably in this phase of the tuberculosis survey. A complete analysis of these data was submitted in an interim report by Colonel Badger to Colonel Middleton who, in turn, had the report forwarded to The Surgeon General.

At the meeting of the Medical Consultants Subcommittee held on 25 June 1943, Colonel Middleton reported that Colonel Badger had found no evidence of a need for a mass survey at this time but had recommended that another spot survey be carried out in September or October 1943. Specific recommendations regarding a mass survey would be withheld until after the next spot survey which might lead to the establishment of an overall policy for the theater. Also at the meeting, Colonel Middleton suggested that a separate project consisting of X-ray examination of soldiers in the 29th Infantry Division who had had no previous chest films might be carried out.

Col. Esmond R. Long, Consultant in Tuberculosis to The Surgeon General, on 11 August 1943, in acknowledging receipt of Colonel Badger's interim report noted that:

* * * In the 3,031 persons examined, 1.1 percent had evidence of re-infection type tuberculosis in their X-ray films. It is gratifying to note that 90 percent of the cases discovered were in the minimal stage, and that of the entire group of 35 cases, only five were considered to be clinically significant.



FIGURE 138. Col. Theodore L. Badger, MC, examining chest X-ray films in connection with the tuberculosis survey, 5th General Hospital, Salisbury, Wiltshire, England, 1 May 1943.

Attention is called to the fact that the arrested parenchymal lesions noted do not necessarily represent induction errors. Mobilization Regulations 1-9 permit acceptance of men with arrested tuberculous lesions of minimal extent, provided they do not exceed 5 sq. cm. in total area in flat films, and their stability has been established by study of a series of films. Similar regulations apply in the case of officers.

Further data, indicating the results of followup on these cases, are awaited by this office with interest.

Colonel Badger had expressed the opinion at the 25 June 1943 meeting of the Medical Consultants Subcommittee that not all patients with minimal lesions need be returned to the Zone of Interior, and Colonel Middleton had asked him to prepare an outline of proposals for dealing with patients with minimal lesions. Colonel Badger had then attempted to draw up criteria for dealing with these patients in terms of the formula of the 5-sq.-cm. area mentioned by Colonel Long. Both Colonel Middleton and Colonel Allen objected to a simple mathematical formula as the sole criterion. On 25 August 1943, Colonel Middleton wrote to Colonel Badger, as follows:

If you share my objections to this criterion of the diameter of calcified lesions, you will certainly add some qualifications, such as the clinical history of probable activity and the age of the subject. Colonel Allen has suggested a 30 year limit, but the final definition is in your hands. What I am driving at is avoidance of a definition that fails to take into account the vital pictures of biologic resistance, and attempts to fix eligibility according to mathematical rules.

Final decision had to await the results of the second spot survey, planned for September or October 1943. The survey was carried out as scheduled in generally the same manner as the first, except that it concentrated upon medical and infantry troops—the 49th and 168th Station Hospitals and the 5th Infantry Division—recently arrived in the United Kingdom after considerable service in Iceland. In addition, considerable numbers of personnel from units in the Eighth Air Force were also examined by X-ray. Total examinations amounted to 3,634 roentgenograms of the chest. The results again indicated that there was no significant incidence of unrecognized tuberculosis among U.S. troops, that a mass survey was not indicated at that time, and that periodic spot surveys were the most appropriate means of determining whether any significant changes in the incidence of tuberculosis had occurred.⁷⁴

In this second survey, X-ray examination of the personnel of the 49th Station Hospital in Scotland was conducted by that hospital, and the plates were then forwarded to Colonel Badger and Major Smedal for reading. Another innovation concerned the field trial of an experimental auxiliary X-ray unit established by Colonel Allen. Sometime before the survey was begun, Colonel Middleton also wrote, in his letter of 25 August 1943 to Colonel Badger, as follows:

I am pleased that you are affording Colonel Allen an opportunity of testing his field unit at the time of your next survey. From the personal conversations, I realize that he is loath to make such requests, in fear that you may think that he wishes to encroach upon your provinces. I know that he has no such design but visualizes this is the only project in which he can test his field unit to a useful end without setting up an artificial program.

On 21 September 1943 in a formal letter from the Office of the Chief Surgeon, Headquarters, ETOUSA, to the Surgeon, Southern Base Section, it was requested that Colonel Badger give an experimental auxiliary X-ray unit a 30-day field test and report on the adequacy of the equipment and the quality of the technical work performed. Unfortunately, Colonel Allen was on temporary duty in the North African theater during the latter part of September and the first half of October 1943; thus, when the auxiliary X-ray unit (fig. 139) was turned over to Colonel Badger, equipment difficulties had not yet been satisfactorily resolved, and the three enlisted technicians were not yet adequately trained. As a result, no field trials were conducted, but Colonel Badger was able to experiment further with the equipment, train the enlisted men and make recommendations for modification.⁷⁵

During the period of this second survey, the 35 individuals with parenchymal lesions previously discovered were followed up through Colonel Long, who was able to trace 13 preinduction X-rays and to reinterpret them in the light of subsequent findings in the European theater. No significant differences were noted, and there were only minor variations of interpretation, owing to poor X-ray films. This small study confirmed the accuracy of procedures being used in the European theater and showed that very little of importance

⁷⁴ See footnote 73, p. 406.

⁷⁵ Eventually, 12 auxiliary X-ray units were employed during combat in the European theater.

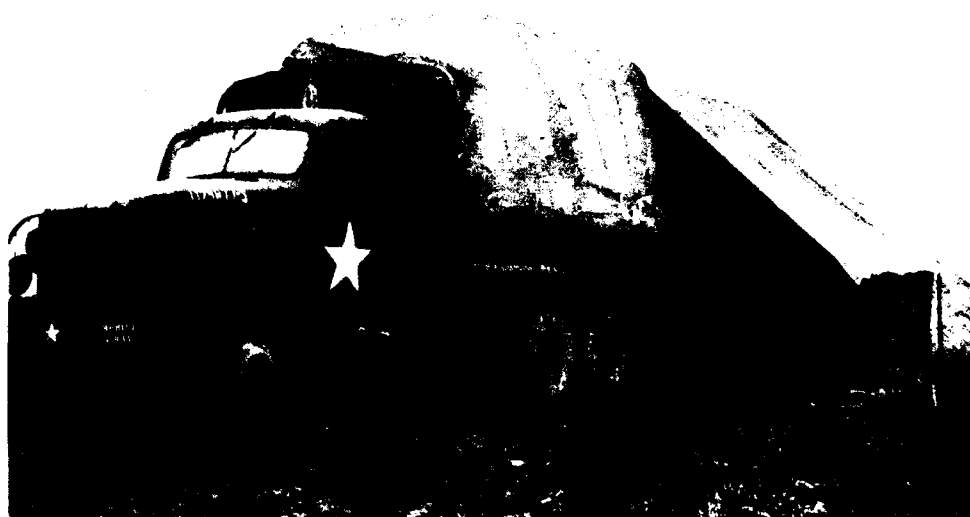


FIGURE 139. - Col. Kenneth D. A. Allen's mobile auxiliary X-ray unit set up in the field.

had been permitted to escape the induction screening. Those who had escaped detection presented for the most part old fibrotic, apparently healed lesions, which had not broken down in an oversea theater.⁷⁶

Within less than 1 year, considerable data had been assembled from the two spot surveys and the collateral studies. In addition, a special series of 578 chest films had been made on personnel of the Women's Army Corps in England. The total number of individuals examined by X-ray amounted to 7,243. The senior consultant in tuberculosis could now, with assurance, submit recommendations for the establishment of theater policy on the disposition of tuberculous patients. This he did on 12 November 1943, in a letter to Colonel Middleton, who concurred in all but one detail; namely, the place of gastric washings in the diagnosis of tuberculosis. "If we are to take the position that any essential element in laboratory diagnosis is a 'burden,'" Colonel Middleton wrote to Colonel Badger, on 15 November 1943, "we close our doors to certain invaluable aids."

On 28 December 1943, Colonel Badger, in submitting to Colonel Middleton revised recommendations in which the ultimate decision for disposition was placed on the individual examiner, wrote the following:

No fixed scheme of classification for disposition of tuberculosis covers every case of disease. Therefore the following criteria for disposition diverge from MR 1-9 on the basis

⁷⁶ (1) See footnote 73, p. 406. (2) Letter, Senior Consultant in Tuberculosis, ETOUSA, to Office of the Surgeon General, attn: Chief of Division of Tuberculosis (Thru: Office of the Chief Surgeon, Headquarters, ETOUSA), 14 Nov. 1943, subject: X-ray of Soldiers in ETO Compared With Interpretation of Induction X-rays.

of experience gained in the E.T.O. They are presented to serve as an objective basis on which the examiner may make his decision of disposition in an active theater of operations.

Certain of the lesions described present a precarious prognosis unless followed carefully over a period of months by clinical and X-ray observation. Under battle conditions in this theater such follow-up would be difficult if not entirely impossible and the evaluation of parenchymal lesions must be carried out to the best of the ability and wisdom of the examiner at a single hospital period of observation.

In addition, Colonel Badger gave detailed recommendations for (1) cases to be boarded to the Zone of Interior, (2) cases to be returned to full duty, (3) cases to be returned to noncombat duty, (4) a yardstick to determine activity in small lesions of doubtful stability, and (5) procedures for the follow up under battle conditions of individuals with small tuberculous lesions.

The revised recommendations were approved by Colonel Middleton on 9 January 1944. The salient points were published on 22 February 1944 in Administrative Memorandum No. 22, the Office of the Chief Surgeon, Headquarters, ETOUSA, to surgeons of all base sections and commanding officers of all U.S. Army hospitals. The yardstick for determination of activity in small lesions of doubtful stability, published as paragraph 6 of the directive, was as follows:

* * * The clinical, laboratory and X-ray study necessary to clarify the status of the small parenchymal lesion, thought to be tuberculosis, should fulfill the following minimal standards:

- a. Hospitalization for at least a week, with limited ward activity.
- b. Complete history and physical examination with special reference to tuberculosis or other pulmonary background.
- c. Four hourly temperature, pulse and respiration, which will be *charted* for clearer detection of elevations.
- d. X-ray and fluoroscopic study of the lungs on the 1st and 7th day of admission.
- e. Complete blood and urine examination.
- f. Sputum examination daily for tubercle bacilli, except where sputum is scanty, repeated 3-day concentrated specimens will be used.

In addition, sedimentation rate, aspiration of gastric contents only with guinea-pig inoculation, and the tuberculin test were listed as additional procedures, not necessary routine. The directive concluded with the following paragraph:

X-ray and clinical follow-up of individuals with small tuberculous lesions in this theater. Battle conditions in this theater do not permit of clinical and X-ray observation for follow-up. The proper evaluation of these parenchymal lesions depends upon the ability and wisdom of examiner during a single hospital period of observation using paragraph 6 as the basic yardstick for evaluation of these lesions not proven to be active tuberculosis. Individuals presenting an undue risk of reactivation or who may become a source of tuberculous infection will be evacuated to ZI.

In addition to the directive, Colonel Badger prepared an article for the *Medical Bulletin*, European Theater of Operations. This article explained the underlying considerations for the decisions that had been made and elaborated on some of the finer points of the directive.

Allergy

On 12 July 1943, a letter from the Office of the Chief Surgeon, Headquarters, ETOUSA, instructed commanding officers of all U.S. Army hospitals and general dispensaries to send to the 298th General Hospital all allergic patients under their care who required greater diagnostic and therapeutic facilities, making the necessary arrangements in advance with the Commanding Officer, 298th General Hospital.

The 298th General Hospital was an affiliated unit from the University of Michigan. Lt. Col. (later Col.) John McF. Sheldon, MC, Chief, Medical Service, 298th General Hospital, had brought with him a small but representative selection of testing extracts as well as some therapeutic material from the allergy clinic of the University of Michigan Hospital. Previous to the designation of this hospital as the allergy center, a number of allergic inpatients and outpatients had been seen by Colonel Sheldon. When it became apparent that allergic manifestations would present an increasing medical problem, more material for skin testing and desensitization had been acquired from the University of Michigan Hospital, and Colonel Sheldon was also able to obtain additional diagnostic British grass pollen from Dr. David A. Williams, Llandough Hospital, Cardiff, South Wales.⁷⁷ Thus, the opportune combination of the foresightedness and initiative of an individual medical officer and the affiliation of the unit with a university hospital had made possible a specialized allergy center.

In evaluating the hay fever problem, Colonel Sheldon said, at the second conference of the chiefs of medical services held on 30 July 1943:

It is a seasonal disease, particularly in reference to pollinosis. It is only within the past year that Dr. Williams, University of South Wales, has carried out adequate observations throughout a large portion of the country. His information is not published. He has shown me his data. Particularly the grass family and specifically those closely pathologically related to Timothy produce pollens for a rather short season, approximately 6 weeks. Our experience this year has followed this pattern. We had rather a high rise in late June, which dropped in July. Timothy, plantain and the orchard grass group seemed to be the predominant offenders. * * * We do not expect to have any important seasonal pollinosis, with the exception of that occasional case of hay sensitivity. We do not expect any of those patients who had difficulty with the ragweed family at home to have any trouble here. Grass sensitive people have just as severe symptoms here as in the States. I do not believe that it is a great problem. There is also a question of sensitivity to that unknown factor that occurs in old houses. These patients respond markedly to dust extracts.

Following Colonel Sheldon's remarks, Colonel Middleton commented: "We have not enough men or materials to duplicate the study of sensitivity in many centers. For the time being those patients who do not respond to ordinary measures should be sent to the 298th General Hospital."

During the first 6 months that the allergy clinic was operating at this hospital, 293 consultations were held, and 98 cases of bronchial asthma were evacuated to the Zone of Interior. In 1944, the 298th General Hospital planned

⁷⁷ Annual Report, 298th General Hospital, European Theater of Operations, United States Army, 1943.

to have a separate ward for allergy and bronchial asthma patients. The anticipated greater need for diagnostic and treatment materials precluded continuation of the former informal means of obtaining them; requisitions were made through regular medical supply channels instead. Preparations for the invasion of the Continent and a change in mission for the hospital, however, prevented carrying through many aspects of these plans.⁷⁸

Influenza

At a meeting of the Inter-Allied Conferences on War Medicine, Colonel Middleton reported the following: "In November 1943, an ominous situation confronted us in an explosive epidemic of virus A influenza. Fortunately it was an inter-pandemic episode, free from complications and mortality. Had it been the first wave of a true pandemic, the invasion of the Continent would have been handicapped by the second and complicated sequence."⁷⁹

Epidemic influenza in England had been appearing in the odd-numbered years with a larger wave every fourth year. According to this schedule, a moderate outbreak should have occurred in January 1943 and a severe outbreak in January 1945. Had this expected influenza visitation of January 1945 actually come about, its effects would have been severely felt by the U.S. Army whose hospitals, at that time, were filled to capacity with surgical and cold injury cases.⁸⁰

As it was, the Committee on Infectious Diseases composed of Colonels Kneeland, Gordon, and Muckenfuss, at its meeting of 19 September 1943 (p. 401), had already made preliminary plans in anticipation of the occurrence of influenza. The committee had suggested the following:

In view of the fact that influenza may at any time become an important cause of disability (and with the experience of the last war in mind), it is considered wise to keep a close watch on influenza-like conditions under treatment in hospitals. Here one is confronted with a disease where definition is extremely difficult, and in which routine reports may give a thoroughly misleading picture. As the appraisal of influenza requires a uniform critique it was suggested that the consultant make periodic visits to station hospitals in order to keep abreast of the situation.⁸¹

As with atypical pneumonia, the committee thought that, under the direction of Colonel Kneeland, it would be wise to collect limited amounts of sera for antibody determination. Limited-scale virus studies could then be made by Capt. (later Lt. Col.) Joseph E. Smadel, MC, at the 1st Medical General Laboratory.

Just as the committee had anticipated, indications of influenza appeared first in the fixed hospitals of the theater. The 108th, 32d, and 5th General

⁷⁸ Annual Reports, 298th General Hospital, 1943 and 1944.

⁷⁹ Inter-Allied Conferences on War Medicine. *Progress in War Medicine Since 1939*, sec. XIII. Edited by H. L. Tidy. London: Staples Press, 1943.

⁸⁰ The full implications of what would have occurred and observations on what actually transpired have been described by Colonel Kneeland in the chapter on respiratory diseases in "Medical Department, United States Army, Internal Medicine in World War II. Volume II. Infectious Diseases." [In preparation.]

⁸¹ Letter, Lt. Col. Yale Kneeland, Senior Consultant in Infectious Diseases, to Col. William S. Middleton, Chief Consultant in Medicine, ETOUSA, 27 Oct. 1943, subject: Meeting of the Atypical Pneumonia Board.

Hospitals and the 130th Station Hospital reported almost simultaneously a significant change in the clinical expression of respiratory diseases during the first week in November. Major Smadel established marked increase in the titer of antibodies to virus A in typical subjects of the epidemic disease.⁸²

Colonel Kneeland, attending the Chief Surgeon's Consultant Committee meeting of 22 November 1943, commented on the spread of influenza in the U.S. and British Armies in the theater, where it had aroused a great deal of interest and some alarm. He assured the conferees that there was no reason to regard this epidemic as anything like that of 1918. He said that a brief note was being published in the *Medical Bulletin* of the European theater and that a directive was being promulgated.

The directive, he said, would first cover clinical aspects of the disease, pointing out that it is mild and almost invariably uncomplicated. Medical officers would be exhorted to give the term "influenza" a fairly limited and precise significance, applying the diagnosis on epidemiologic grounds to an explosive disease of the clinical character described, occurring in groups and not in isolated cases. The directive would emphasize that the precise identification of the etiologic agent could only be made by a study of antibody titers in convalescents as opposed to acute symptoms in the clinical case. Because only a limited number of these examinations could be made at the 1st Medical General Laboratory, it was urged that serum specimens be sent through channels, while the 1st Medical General Laboratory should be consulted as to the desirability of submitting samples from various types of cases. Finally, Colonel Kneeland reported, the directive would cover treatment by the statement that it is systematic. It would note that sulfonamides are contraindicated as being of no benefit except in complications, and these almost never occur.

The meeting later turned into an open discussion of the epidemiology of influenza and the possibility of identifying factors that made the current epidemic skip a year and occur so late in season. The theme underlying this discussion was, of course, an attempt to determine whether it would be possible to predict the future occurrence of an epidemic of influenza.

The outbreak of upper respiratory disease continued throughout November. For the week ending on 26 November 1943, there were 11,300 cases of acute respiratory infection among United States elements in the theater. Some 600 of this number were reported as influenza, although it seemed likely that much more than this was true epidemic influenza. The peak incidence of these upper respiratory infections was reached during this week, but the peak in the curve of reported influenza did not occur until the week ending on 3 December 1943. After that date, there was a steady decline which paralleled the decline for all respiratory disease.⁸³ Influenza was never again a problem. Many theories were later proposed explaining the occurrence of influenza at this time which, as if by fate, coincided with that period of the European theater when it could best cope with the problem.

⁸² Annual Report, Chief Consultant in Medicine, ETOUSA, 1943.

⁸³ Essential Technical Medical Data, Headquarters, ETOUSA, for months of November and December 1943.

Malaria

The 1st Infantry Division was moved from Sicily to the United Kingdom in the first part of November 1943. Within a month, the division reported over 200 cases of malaria in hospitals or on quarters. At about the same time, 27 cases of malaria occurred in a bomber group which had recently arrived in the United Kingdom via the southern ferry route. There was every indication that the number of cases would increase with the shift of more troops to England from the Mediterranean theater.⁴⁴

Colonel Middleton obtained data as to the actual incidence of clinical malaria from hospitals where cases were appearing. Two lengthy directives (Circular Letter No. 117 dated 12 August 1943, and Circular Letter No. 142 dated 17 September 1943) had been published by the Office of the Chief Surgeon, Headquarters, ETOUSA, with respect to the management of malarious patients, but these were generally a mere restatement of opinions received from the Office of the Surgeon General. The immediate need was for more specific instructions to meet the sudden rising incidence of malaria in the theater. Accordingly, from the data at hand, the Office of the Chief Surgeon, Headquarters, ETOUSA, on 16 February 1944, published Circular Letter No. 24 on the management of the convalescence of malaria. The circular letter emphasized dietary, therapeutic, and psychologic means of insuring early convalescence and rehabilitation of debilitated and depressed malarious patients while avoiding serious relapses or postponement of complete convalescence.

Colonel Middleton was aware, however, that there were many unanswered questions as to the course of tertian malaria and the efficacy of various regimens of treatment. In a letter to Colonel Middleton, General Morgan in the Surgeon General's Office, suggested approaches to the study and solution of some of the most pressing questions. Colonel Middleton called upon Colonel Muckenfuss and Maj. (later Lt. Col.) Henry P. Colmore, MC, to meet with him as an informal malaria committee. Major Colmore, who was then assigned to the 2d General Hospital, was undoubtedly the best qualified officer in the theater in the field of tropical diseases. Among other positions, he had recently been an associate on the staff of the School of Tropical Medicine, San Juan, P.R.

The malaria committee met at the 1st Medical General Laboratory on 10 March 1944 and made plans for a controlled study of benign tertian malaria. The study envisaged a pursuit of two problems: (1) Would the natural course of the disease lead to a spontaneous "burning out"? (2) What were the effects in various dosages of certain agents such as quinine, Atabrine (quinacrine hydrochloride) and Plasmochin Naphthoate (pamaquine naphthoate)? It was proposed that subjects for the study could be obtained from volunteers suffering relapses of malaria. It was agreed that Major Colmore should be placed on temporary duty at the 1st Medical General Laboratory to conduct these studies. The plan was submitted to General Hawley for approval the

⁴⁴ Essential Technical Medical Data, Headquarters, ETOUSA, for November 1943.

following day. General Hawley initially disapproved the study but upon further consideration reversed his decision.⁸⁵

Major Colmore was able to begin the malaria study on 14 April 1944.⁸⁶ At the outset, a problem appeared which prevailed throughout the study. The first 16 soldiers queried refused to volunteer for the experiment because of their desire to rejoin their organizations and buddies. As the invasion fever reached a higher pitch, this desire on the part of individuals to return to their units increased. There were also those who refused to cooperate because of past experiences with the disease. During the 1½-month period of the study, only 24 volunteers were obtained. Among the volunteers, there were extremely few cases that met the criteria required for a study of spontaneous remission; that is, chronic recrudescent uncomplicated benign tertian malaria. Accordingly, therapy was withheld from no individuals. In order to determine whether the small number of chronic recrudescent cases was merely a chance finding in the small group of 24 volunteers, Major Colmore questioned patients at the 3d Station Hospital and examined the files of the Surgeon, 2d Armored Division, where there was a record of 2,454 individuals with one or more attacks of malaria. He determined that the recurrence rate for benign tertian malaria was not a problem and that it compared favorably with figures quoted for civilians living under less rigorous conditions. The interviews and examination of records also revealed that there was a sudden increase in the incidence of malaria in March, April, and May, which was attributable to the characteristic late relapse of benign tertian infection rather than to the chronically recrudescent type.

Furthermore, the study of the relative effectiveness of antimalarial therapy, including a comparison of Atabrine and quinine, with the necessary followup procedures, was precluded by the impending invasion. Accordingly, Major Colmore spent a considerable period of the malaria study in devising a code for the classification of different patterns of relapses and recurring malaria and analyzed the records of patients using this code.

Accepting Major Colmore's recommendations, Colonel Middleton discontinued the study in late May 1944. Partly as a result of Major Colmore's studies, however, it was possible to plan for the expected incidence of malaria in the coming invasion. Plans for the reception and treatment of casualties with relapsing and recrudescent malaria were made by Colonel Middleton with Colonel Kneeland, acting in his capacity as Consultant in Medicine, Southern Base Section, and with Lt. Col. (later Col.) Neil L. Crone, MC, Consultant in Medicine, First U.S. Army. On 18 May 1944, Colonel Middleton conferred with General Hawley and Colonel Gordon as to the missions and functions of preventive medicine personnel vis-a-vis agencies for the clinical treatment of malaria during the coming operations. On 20 May 1944, all the previous

⁸⁵ Memorandum, Professional Services Division, for Chief Surgeon, ETOUSA, 11 Mar. 1944, subject: Proposed Research on Malaria, with comment 2, thereto.

⁸⁶ Letter, Maj. H. P. Colmore, 1st Medical General Laboratory, to Chief Consultant in Medicine, Office of the Chief Surgeon, Headquarters, ETOUSA, 1 June 1944, subject: Study of Malaria.

theater directives on the treatment and management of malaria were rescinded and replaced by one comprehensive and pertinent directive, Circular Letter No. 73, Office of the Chief Surgeon, Headquarters, ETOUSA.

Other Activities

Among other activities engaged in by medical consultants in the European theater, the following are worthy of mention in concluding these paragraphs on the buildup of U.S. Army forces in the United Kingdom preparatory to the invasion of continental Europe.

Typhus commission.—Colonel Kneeland was a member of a three-man typhus commission from the European theater which visited the Near East and the North African theater in February and March of 1944. Other members were Lt. Col. (later Col.) Emory C. Cushing, MC, an epidemiologist representing the Preventive Medicine Division, Office of the Chief Surgeon, Headquarters, ETOUSA, and Major Smadel. The commission made a team approach to the study of typhus and submitted its findings, by letter, dated 2 March 1944, from Headquarters, First Medical General Laboratory, to the Chief Surgeon, ETOUSA, subject: Report of Mission on Typhus, ETO. A complete discussion of typhus fever in World War II can be found in other volumes of this history.

Recommendations concerning heart diseases.—Colonel Hein called attention to the possibility of traumatic heart diseases which could easily be overlooked. One possible source of heart damage was low oxygen pressures at high altitudes; another was accidents, as when a heavy object falls upon the soldier. Electrocardiographic equipment was placed in all general hospitals and proved very useful in making reliable decisions for the disposition of patients. Placement of electrocardiographic equipment, and basal metabolism apparatus as well, in certain station hospitals was on several occasions recommended to General Hawley, but he remained opposed to the extension of these functions to station hospitals. Courses in the use of electrocardiographic equipment were given at the European theater Medical Field Service School. As a result of recommendations on arterial hypertension made by Colonel Hein, it became acceptable policy to retain in the theater those individuals whose only abnormality was an elevation in blood pressure.⁸⁷

Penicillin study.—Colonel Kneeland on 1 June 1944, submitted a report to Colonel Middleton on a study of nearly all cases (except venereal diseases) treated with penicillin on the medical services of U.S. Army hospitals in the United Kingdom over the preceding 8 months. Owing to shortages of penicillin, its use in medical cases was limited to those in which it was thought essential to recovery. In only a few cases of lobar pneumonia and one of meningitis was it used deliberately for experimental purposes as the only therapeutic agent. It was impossible to draw any conclusions from many cases in which it had been used in conjunction with other agents; other patients were

⁸⁷ Minutes of meeting, Medical Consultants' Subcommittee, 24 Jan. 1944.

first treated with penicillin when obviously moribund. There were, nevertheless, some cases in which the diagnosis was unequivocal, and the effect of penicillin could be clearly discerned.

Limited as he was by the type of data available and considering the shortage of penicillin, Colonel Kneeland ventured to say that the paucity of cases for study in itself indicated that, apart from venereal disease, there were comparatively few medical cases in Army hospitals that absolutely required this antibiotic. Sustaining previously known fact, there was evidence that penicillin was the most effective agent available at the time against general infections due to staphylococcus. It also appeared to be highly effective against the meningococcus and the pneumococcus, although its superiority to sulfonamides in these fields was not unequivocally demonstrated. Nevertheless, Colonel Kneeland thought that its use was indicated as an adjunct to sulfonamide therapy in overwhelming infections due to either of these bacteria. Lastly, Colonel Kneeland stated that, when penicillin was employed in mixed infections, the results were likely to be disappointing.

This penicillin study concluded by Colonel Kneeland, limited as it was in many ways, was nevertheless of considerable importance in making plans for the next phase of operations in the theater.

NORMANDY INVASION AND CAMPAIGNS IN NORTHERN FRANCE

First and foremost in the minds of all stationed in the United Kingdom was an eventual assault on the Continent. As the buildup in England and Northern Ireland continued until it seemed as if the United Kingdom were completely saturated with the tremendous concentration of men and materiel, excitement over the invasion rose to fever pitch. However, the sober picture of thousands of battle casualties and soldiers becoming seriously ill under the primitive conditions of land warfare served to temper, for the medical officer, excitement over the prospect of coming to grips with the enemy on his own ground. To insure the U.S. soldier prompt medical attention regardless of how or when the need for it arose, plans that were flexible, practical, and always current were required. To this end, each division of General Hawley's office maintained a policies-and-procedures document for mounting the operation. Colonel Middleton, accordingly, contributed to the policies-and-procedures document of the Professional Services Division, Office of the Chief Surgeon, Headquarters, ETOUSA.⁸⁸

Preparatory Measures

Regardless of how worthy a plan might appear on paper, it could never be more effective than the means available to implement it. The primary problem was one of personnel. There should have been qualified medical officers

⁸⁸ Memorandum, Chief Consultant in Medicine, for Chief Surgeon, ETOUSA, 5 Apr. 1944, subject: Medical S.O.P. for Evacuation from "Overlord."

in all echelons of evacuation and in all installations where casualties from the operations could be expected, but this was not the case. The problem has been discussed elsewhere (p. 248), but it is worthy of note here that, as early as February 1944, Colonel Middleton had surveyed the fixed hospitals of the theater and had compiled a list of 89 officers who could be used to strengthen units arriving from the Zone of Interior or transferred elsewhere as required.⁸⁹ Even at a time when the invasion was imminent, a survey of key fixed hospitals revealed the need to replace the chiefs of medicine in two general hospitals.

Forward medical echelons were provided with large amounts of diphtheria antitoxin, and motion-sickness preventives were issued on the basis of 10 capsules per individual. In addition, a 2 weeks' supply of Atabrine was provided each soldier with a previous history of malaria. The U.S. Army in the European theater was dependent upon British sources for many items of supply, among which were respirators. Through the auspices of the Medical Subcommittee, Army Medical Consultants, Committee of the Royal Army, Colonel Middleton was able to obtain a promise for 18 respirators to be used in the amphibious operation.⁹⁰

Colonel Middleton and his subordinate consultants in the base sections insisted in all their contacts with hospitals that the medical service must be prepared to function under the central leadership of the commanding officer to insure teamwork under stress. In order to achieve this flexibility, 4 officers from the medical service were trained to head shock teams working under the direction of the chief of surgical service, and 2 officers from the medical service were trained in anesthesia. These arrangements applied to all 750-bed station and 1,000-bed general hospitals, with a proportionate ratio of officers to be trained for these functions in the medical services of smaller hospitals (fig. 140).⁹¹

Initially, it was thought that triage of patients according to their diagnoses would be possible at the hards where patients were to be unloaded following evacuation across the Channel by ship. Accordingly, Colonel Middleton and Colonel Kneeland, the latter in his capacity as the medical consultant for the Southern Base Section, selected and designated a well-trained clinician for each point of triage. Specific plans were also made by Colonels Middleton and Kneeland for the evacuation of patients with communicable diseases and all those who were seriously ill to designated hospitals.⁹²

After the transit hospitals were designated (p. 329), Colonel Middleton made a tour through each of them to give personal instruction in certain basic principles of reception and evacuation of medical casualties. In addition, field hospitals were to be set up in close vicinity to the hards as holding units to

⁸⁹ Memorandum, Professional Services Division, for Chief Surgeon, ETOUSA, 24 Feb. 1944, subject: Medical Officers Available for Transfer to Units.

⁹⁰ Memorandum, Professional Services Division, for Chief Surgeon, ETOUSA, 10 Mar. 1944, subject: Medical Subcommittee, Army Medical Consultants' Committee.

⁹¹ Essential Technical Medical Data, Headquarters, ETOUSA, for June 1944.

⁹² See footnote 88, p. 419.



FIGURE 140. Type of shock ward envisioned by Colonel Middleton, in actual operation in the 110th Evacuation Hospital, Clervaux, Luxembourg, 3 March 1945.

receive casualties who could not stand the 15- to 20-mile ambulance trip to the transit hospitals (fig. 141).²⁷ Colonels Middleton and Kneeland made a survey of all these hospitals in the early spring of 1944 and drew the following conclusion, which was included in the theater chief consultant's evacuation plans for OVERLORD:

The qualifications and professional performances of the several officers of the Medical Services have been carefully reviewed with the Consultant in Medicine of the Southern Base Section.²⁸ It is our measured judgment that the strength and professional abilities of the involved units are equal to the anticipated task. However, to avoid confusion under the pressure of operations, it is urged that a reserve of qualified internists be set up in the Southern Base Section for mobilization upon demand. In all probability a number not to exceed four (4) for each of the Transit Hospitals would meet any need.

At what turned out to be nearly the last minute, two elements of the basic plan were changed. There was to be no medical triage at the hard. There were to be no specialized hospitals for the treatment of specific conditions. The seriously ill and those with communicable diseases were to be sent to the most accessible transit hospital. The category of nontransportable patients was to include the following: Communicable diseases, meningococcal infections, pneumonia and pneumococcal infections, septicemia, diabetic coma, uremia, coronary occlusion, bleeding peptic ulcer with dangerous blood loss, and serious pulmonary hemorrhage. It was expected that these patients after

²⁷ Ibid., 10, 16, 17, 19-21.

²⁸ Ibid., 10, 16, 17, 19-21.



FIGURE 111.—Reception area, 58th Field Hospital near Weymouth, England, 12 June 1944.

appropriate treatment would become transportable within a very short time, whereupon they would be removed to a more remote hospital.²³ The only triage which could be carried out was the sorting of transportable and non-transportable patients at the transit hospitals.

Throughout this whole preliminary period, Colonel Middleton held frequent conferences with the medical consultants in the First and Third U.S. Armies and Southern Base Section to correlate and define their respective functions. This having been done, Colonel Middleton delegated the responsibility for supervising the reception and movement of medical patients in transit hospitals to Colonel Kneeland.

Estimate of the situation. Only a month before the invasion actually took place, Colonel Middleton thought that the medical services of the theater would be faced with the following situation:

An accurate estimate of the expected load of the OVERLORD OPERATION must depend upon a number of unavailable factors. However, upon past experience in over-water operations the categories may be divided into three groups, namely, wet, wounded and sick. Provision should be made for the exhausted, wet soldiers who are not sick or wounded. Past experience has indicated that they prove a considerable load upon hospital beds for four or at most a few days.

²³Letter, Officer in Charge, 3rd Army, ETOC, SA, to Surgeon, 3rd Army, ETOC, SA, 27th June 1944, and 5th Medical Group, AFHQ, 1st Force, 1st Army, to Chief of Medical Consultants, 1st Army, 1st Force, 1st Army, 27 June 1944.

Obviously, the wounded will constitute the overwhelming majority of early casualties. This predominance will probably amount to 80 percent of the total for the first 24 hours. For the first week it is estimated that the total load will be 60 percent surgical, and 40 percent medical. After the first week a fair estimate will reverse this figure. On this basis, 400 medical patients may be anticipated out of each 1,000 evacuees to the near shore. For the first week of such an operation, a fair estimate would give an overall figure of 25 percent neuropsychiatric casualties. Hence, 250 of the 400 medical patients would be neuropsychiatric, and 150 sick. On the basis of available data, 100 of these medical patients would be seriously ill and 50 would have lesser ailments. After the first week it is predicted that the figures for neuropsychiatric and medical patients will be reversed.⁹⁵

The Invasion and Its Aftermath

On 4 June 1944, just 2 days before the invasion, all consultants in the Office of the Chief Surgeon, Headquarters, ETOUSA, received the following directive from Colonel Kimbrough:

In the continental liberation, the members of the consultant group will carry out their duties as consultants in the transit hospitals and other hospitals in echelons in the rear of the transit hospitals.

The consultants' activities in echelons forward of the transit hospitals will be carried [out] at the direction of the Chief Surgeon, ETOUSA, and the surgeons of such echelons.

These restrictions were no hardship to the theater chief consultant in medicine since he had, from the beginning, planned to operate in this manner.

On D-day, 6 June 1944, Colonel Middleton by chance had arranged for a field trip to three transit hospitals, the 38th Station Hospital and the 48th and 158th General Hospitals at Stockbridge, Hantshire, and Odstock, respectively. The units had received orders to evacuate all transportable patients, and Colonel Middleton observed that they carried out this mission with great facility and complete lack of confusion. Refraining from further movement in the area of transit hospitals, Colonel Middleton, for a period of about 3 weeks, confined his activities to fixed hospitals of the rear echelon of the Communications Zone. His observations, made during June 1944, were as follows:

The expeditious, thoughtful and adequate reception of hospital trains and convoys. This circumstance applied almost universally and was most conspicuous in new and untried units. Their pride in accomplishment was only equalled by the Chief Consultant's appreciation of the strides in organization made under pressure (fig. 142).

Condition of patients. As a clinician, one could not escape the impression of the uniformly good physical status of all patients. Hundreds of temperature charts were reviewed, with fever as the rare exception, a circumstance in startling contrast to the experience of World War I.

Special problems. Isolated instances of hemothorax and pneumothorax led to the early suggestion of the assignment of an officer from the Medical Service to each surgical ward receiving such patients. This opportunity for co-ordinated effort has been early implemented to the advantage of the wounded soldier.

Minor casualties. In the original medical S.O.P., attention was called to the desirability of diverting "wet" soldiers from lines of evacuation. An oversight of this principle led to the occasional movement of valuable personnel well to the rear, into fixed hospitals, when a change of clothing might have returned them to active duty from shipboard or at the hards

⁹⁵ See footnote 88, p. 419.



FIGURE 112. Reception of hospital trains and convoys. A. Ambulances being loaded at quayside, Weymouth, England, 10 June 1911. B. Ambulatory patients arriving by motor convoy at trainside for further evacuation inland.



FIGURE 142. Continued. C. Care and attention on hospital train during evacuation in England.

(fig. 143). An amazingly high incidence of trivial wounds, that might well have received simple dressings and returned to duty, was encountered in these hospitals (fig. 144).

Morale. The general observation of extremely high morale contrasts with reports from certain other operations. This reaction unquestionably reflects upon the quality of the command as well as the stability of the soldier. With few exceptions these men were keen to return to the fight. It pays to have landing operations, so expensive in manpower and materiel, well covered by naval and air protection. The soldiers commented at great length upon these advantages.

Medical casualties. The proportion of medical evacuees from the continent has risen from approximately 3 percent for the first week to 5 percent for the second week and 10 percent for the third. These figures are far below the anticipated level, a circumstance which may be explained by the policy of evacuation from the far shore, or by the unusual health of the command in France. Certainly, we may anticipate adequate care of the sick, whatever the command policy may be.

Relapsing malaria has been the most frequent cause of evacuation. In all instances this may be traced to a discontinuance of supervision of Atabrine therapy, although a two weeks' supply was afforded to each soldier with a previous malarial history.

A specific problem presents itself in the unexpectedly low incidence of shock neurosis. Colonel Thompson's figure of 2.4 percent contrasts rather sharply with the British figure of 10-12 percent for the same operation. Again, this may reflect the unusual selection of troops for this operation, or the high morale of the same. It will be most interesting to evaluate the experience in the light of prophylactic measures taken against battle fatigue and neurosis in the indoctrination of line officers as well as medical officers of the First Army.²⁶

²⁶ See footnote 91, p. 420.



FIGURE 143. "Wet" casualties of Normandy invasion reach English shore, 7 June 1944.

It is the customary fate of predictions that they must be modified in the light of subsequent events, and plans based upon them must also be changed. For Colonel Middleton, the change was a favorable one. The light load of medical evacuees gave him an early opportunity to survey the medical situation in the First U.S. Army. The Chief Surgeon, ETOUSA, and Surgeon, First U.S. Army, both approved an early visit by Colonel Middleton to the combat zone (fig. 145). During the period from 29 June to 2 July 1944, Colonel Middleton was provided every facility for the observation and study of medical operations on the Continent. Upon his return to England, he summarized his findings as follows:

Distribution of casualties. In the period from 6-23 June, approximately 2,664 medical patients have been received in the hospitals of the First Army. This number represents approximately 9 percent of the total casualties. In the same period, 2,007 (8 percent) neuropsychiatric subjects have been admitted. The combined figure of 17 percent represents a very small proportion of the total physical load.

Hospital facilities. Under combat conditions the establishment, activation, mobilization and movement of evacuation hospital units have been effected expeditiously and smoothly. This circumstance has insured available beds for all casualties, medical as well as surgical.

Special hospital facilities. Perhaps the most outstanding innovations in the accommodation of army hospitalization to the special needs have been the establishment of Combat Exhaustion Hospitals and the utilization of the 4th Convalescent Hospital for the care of venereal diseases, among other casualties. The diversion of these constant drains upon the beds of mobile hospitals insures a far greater flexibility in the utilization of such facilities for the traumatic conditions of combat.



FIGURE 144. Typical shipload of walking wounded and nonbattle casualties arriving at Weymouth, England, 12 June 1944.

Team work. Under the pressure of combat conditions, all ranks and grades of the Medical Corps have been welded into an effective machine for the care of the sick and wounded. Particular commendation is due the members of the Army Nurse Corps and enlisted personnel, whose arduous duties are being cheerfully and competently fulfilled. The *esprit de corps* is excellent.

Professional services. The high quality of leadership of the [Medical] Consultant of the First Army is reflected in the standards of medical service to soldiers in all institutions visited. This guidance is not only administrative but it has also taken the form of direct professional consultation, educational effort through the Medical News Letter of the Surgeon of the First Army, and personal precept on every available occasion.

Special medical problems. No communicable disease has yet been encountered in epidemic proportions. Occasional instances of mumps, meningitis, pneumonia (pneumococcal and atypical), dysentery and German measles have been reported.

Malaria alone presents a problem of numerical proportions sufficient to require special thought * * *.

Pleurisy has been an occasional problem. The [Medical] Consultant has recommended that pleurisy without effusion (dry) be observed for a period of several days, and if the temperature [drops] to normal within three or four days, the patients be retained in the Army. Pleurisy with effusion is immediately evacuated to fixed hospitals in the Communication Zone.

Primary atypical pneumonia. Primary atypical pneumonia has not been a problem, but in the absence of serious constitutional symptoms and early fall of temperature to normal, such patients may be retained in the Army.



FIGURE 145. Normandy beachhead at time of Colonel Middleton's visit, 1 July 1944.

Bacterial pneumonia, Meningococcal infection and Infectious hepatitis will be sent to hospitals in the Communication Zone.⁹⁷

In addition to the foregoing, Colonel Middleton observed and reported on the handling of venereal disease, and neuropsychiatric practices which have been described in Parts II and III, respectively of this chapter.

As of the end of July 1944, the medical load in the field and in fixed hospitals in the theater continued to be surprisingly light. No communicable disease had occurred in epidemic proportions.

In a survey of 15 general hospitals with respect to personnel professional qualifications, it was found that of 248 medical officers 71 had had only 9 months of internship. The deficiencies in special skills had to be compensated by continuing the policy of moving proved internists from units older in the theater to newly arriving units.⁹⁸

As of the end of August 1944, the medical load of the theater, including neuropsychiatric cases, was 15 percent as compared with 85 percent for surgery, with relapsing malaria the only continuing problem of any proportions. The mobility of the armies (fig. 146) and the policy of keeping towns out of bounds had limited contacts with civilians and forestalled the anticipated increase in communicable disease, including gonorrhea and syphilis.

⁹⁷ See footnote 91, p. 420.

⁹⁸ Essential Technical Medical Data, Headquarters, ETOUSA for July 1944.



FIGURE 146. Breakthrough at St. Lô, medical personnel and equipment of Advanced Section, Communications Zone, move through ruins of St. Lô.

During August, 1 station and 11 general hospitals were surveyed. For this survey, Colonel Middleton had to call upon Colonels Hein and Kneeland, who were then consultants in medicine to the Western and Southern Base Sections, respectively. With few exceptions, the hospitals surveyed required better qualified personnel to fill the top positions in their medical services. In consequence, there was a dilution in the professional skills of the stronger, older units of the theater, but with these transfers there also came an opportunity for well-merited promotions."

Malaria

The occurrence of malaria during this period resulted from two conditions in almost all cases; that is, relapses of early clinical malaria or clinical expressions of earlier parasitism without actual disease. Most of the cases were limited to four divisions which had previously served in the North African theater. The more common cause was relapsing malaria. This occurrence had been anticipated by providing Atabrine for suppressive treatment, and the appearance of clinical malaria in large numbers during this early phase of combat operations indicated breaches in Atabrine discipline or failure in the supply of Atabrine. Exposure, physical chilling, and the excitement of combat (through release of

adrenalin by the emergency mechanism of Cannon) may have been factors in precipitating attacks.

Colonel Crone, of the First U.S. Army, divided patients manifesting clinical malaria into complicated and uncomplicated cases. Complicated cases were defined as those having more than three relapses with one or more of the following conditions: Splenomegaly, anemia, or continued debility. Patients with these conditions were discharged from the Army. The uncomplicated cases were the objects of concern as to possible saving in manpower. These patients were initially treated in mobile hospitals of the army for a period of time necessary to fit them for ambulatory treatment in the 4th Convalescent Hospital assigned to the First U.S. Army. Colonel Crone estimated that for 75 percent of the patients the period spent at the convalescent hospital was 5 days. This policy effectively and noticeably reduced evacuation of malaria casualties to the United Kingdom, while at the same time the use of the convalescent hospital as a holding facility kept these patients from overburdening and clogging the main lines of evacuation.¹⁰⁰

By the end of July, the medical service in the First U.S. Army had done all it could to control the malaria situation and to advise commanders of necessary corrective measures. However, there was no abatement of the incidence of clinical malaria. The 91st Gas Treatment Battalion had been brought in to care for the increased load and was caring for some 400 malarious patients at this time. By all criteria, the supply and the dosage of Atabrine had been adequate to meet the needs for the affected individuals of the four divisions known to contain all of the potential malarious subjects. On 29 August 1944, Colonel Middleton was obliged to advise General Hawley concerning malaria control, as follows:

Obviously, the problem has continued beyond reasonable limits for causes that are now controllable. Atabrine in full doses for suppressive purposes 0.1 gram daily will prevent the clinical manifestations of malaria in an overwhelming majority of instances. The attrition in manpower from this cause has not been disabling, but the Command responsibility for the active administration of the drug should be reiterated in the interest of more effective control.

Tuberculosis

At a meeting of the Medical Consultants, Subcommittee held in January 1944, Colonel Badger mentioned his concern over a certain lack of consideration for the individual tuberculous patient in his processing and evacuation to the Zone of Interior. Colonel Middleton asked him to look into the matter and submit recommendations at a later date. The impending invasion of the Continent and the dissolution of specialized treatment facilities supplied urgency. Heretofore, tuberculous patients to be evacuated to the Zone of Interior had been transferred to the 298th General Hospital for care and therapy until transportation became available.

¹⁰⁰ See footnotes 91, p. 420, and 98, p. 428.

The day after the invasion took place, 7 June 1944, Colonel Badger hastened to submit his recommendations to Colonel Middleton concerning the treatment and evacuation of tuberculous patients. He urged that pneumothorax treatment be used only for the emergency case of tuberculosis or when delay would be injurious to the patient because of hemorrhage or the progressive nature of the disease. He pointed out that collapse therapy was best initiated and carried on when the course of treatment would not be interrupted by frequent transfer of the patient from one operator to another and, usually, when preceded by a month to 6 weeks of absolute bed rest with good diet and nursing care. Colonel Badger noted:

The necessity for frequent refills in the early stages of pneumothorax treatment, and the complications associated with the interruption of treatment in the course of transport, entail hazards for the patient which will either cause delay in transfer to the Zone of Interior, or necessitate conduct of the case by numerous medical officers of varying ideas and experience in collapse therapy. Delays in refills and complications associated with early pneumothorax treatment have been proven unavoidable during the numerous evacuation episodes that mark the course of every transportation to the Zone of Interior.

In addition, Colonel Badger urged that boarding and evacuation procedures be materially speeded up in patients admitted to general hospitals with a definite diagnosis of tuberculosis. He noted also the practice of allowing patients with serofibrinous pleurisy, whose temperature had returned to normal and whose fluid had been absorbed, to return to the Zone of Interior as ambulatory cases.¹⁰¹ He strongly recommended that all patients with active tuberculosis be returned to absolute bed rest for the entire trip.

All of Colonel Badger's recommendations were amplified and incorporated into a directive which was issued from the Office of the Chief Surgeon, Headquarters, ETOUSA, as Circular Letter No. 100, dated 25 July 1944. This circular concluded with the statement: "Recommendations for treatment at absolute bed rest for the entire trip will be entered on the patient's medical record by the medical officer in charge."

In the meanwhile, Colonel Badger had been transferred to the Office of the Surgeon, Forward Echelon, Communications Zone, and subsequently to the 15th Hospital Center, while still retaining his position as the Senior Consultant in Tuberculosis, ETOUSA. Shortly after D-day, Colonel Badger conducted a field trip through station and general hospitals in the Western Base Section to discuss and evaluate tuberculosis problems. He had also requested a report from the chief nurse of the European theater, showing cases of tuberculosis and serofibrinous pleurisy among nurses who had been evacuated to the Zone of Interior. His survey confirmed the fact that tuberculosis was at its lowest ebb and did not constitute a serious problem.¹⁰² The report on the incidence of tuberculosis in nurses, although not equated for differences in the numbers of

¹⁰¹ Letter, Lt. Col. T. L. Badger, to Col. E. R. Long, Chief, Division of Tuberculosis, Office of the Surgeon General, 1 July 1944.

¹⁰² Letter, Lt. Col. T. L. Badger, to Surgeon, Western Base Section, ETOUSA, 2 July 1944, subject: Report of the Senior Consultant in Tuberculosis.

nurses, nevertheless seemed to indicate a considerable increase in the second year of the theater's activities.

In a letter to General Hawley on 14 August 1944, Colonel Badger recommended a spot survey by X-ray for tuberculosis in nurses in 2 general and 2 station hospitals, which had been in the theater from 18 to 24 months, and in 2 general and 2 station hospitals, which had been in the theater 3 to 6 months. He assured General Hawley he would impress each hospital that these X-rays were to be taken at their convenience and when their workload was slack. Colonel Allen, the theater consultant in radiology, approved the use of X-ray films to conduct this spot survey involving 584 nurses, and both Colonels Middleton and Kimbrough recommended approval. General Hawley, however, replied to Professional Services Division as follows: "I am sorry but we are fighting a very rapid war at this moment and such surveys will have to wait until this thing slows down a bit."

And indeed, the fighting was turning into rapid pursuit. The Allies, having emerged from the hedgerows of Normandy, appeared to be on the verge of an unimpeded onslaught to the Rhine and into the Lowlands.

FINAL OPERATIONS

By the end of September 1944, most of the theater headquarters had moved to France, including General Hawley's office. In its wake, a separate command under Communications Zone headquarters had been established in England effective as of 10 September 1944,¹⁰³ and designated the United Kingdom Base Section. Its surgeon was Colonel Spruit, formerly the theater deputy chief surgeon. Colonel Kneeland was named as his consultant in medicine. On the Continent, the Communications Zone had been solidly established with six base sections and the Advance Section, Communications Zone. Thirty general hospitals had been moved to the Continent, of which eighteen were operating. At the front, the Third U.S. Army had entered combat on 1 August and was now assaulting the Siegfried Line on the central front south of the First U.S. Army. The Ninth U.S. Army had entered combat in early September during the siege of Brest and other French ports, and the Seventh U.S. Army, after landing in southern France on 15 August 1944, had advanced northward and during September came under the operational control of the European theater commander. The battle for Germany itself had just begun.

This splitting of medical resources between the United Kingdom and the Continent placed Colonel Kneeland in a unique position among the medical consultants subordinate to the chief consultant in medicine. First of all, the evacuation policy on the Continent was 30 days, while for the theater as a whole it was 180 days. This meant that the greater part of definitive treatment was being carried out in the United Kingdom. Colonel Kneeland's duties, as a member of the Professional Services Division, Office of the Surgeon,

¹⁰³ General Order No. 35, Headquarters, Communications Zone, ETOUSA, 15 Aug. 1944.

United Kingdom Base, were to (1) review treatment procedures, (2) select individuals for professional training, (3) supervise research in military medicine, (4) control activities of hospital center medical consultants, and (5) inspect and evaluate professional care in the United Kingdom.¹⁰⁴ Colonel Middleton, engaged across the Channel, had to delegate many of his own supervisory functions, particularly in research activities, to Colonel Kneeland. He had to delegate to him also many of his close associations with British medicine, both civilian and military, which had proved so profitable in the past. For example, Colonels Kimbrough, Cutler, and Middleton, as chief of professional services and chief consultants in surgery and medicine, respectively, formerly represented General Hawley at meetings of the Penicillin Trials Committee of the British National Research Council. This function had to be delegated to the surgical and medical consultants of United Kingdom Base.

The first problem to be discussed in this period originated in the United Kingdom.

Sulfadiazine Prophylaxis

The Army Air Forces in Britain requested permission of the Chief Surgeon to use sulfadiazine as a prophylaxis against respiratory infections and presented information from the Air Surgeon as to its efficacy. There were certain conditions in the theater, however, that militated against an uncritical approval of the proposed project. The request was referred for consideration to the Committee on Infectious Diseases which was to meet on 28 September 1944. Later, the committee coordinated its deliberations with Colonel Gordon, who had not been present at the September meeting.

The committee defined limited indications for the use of sulfadiazine as a prophylaxis. Two such limitations were when pivotal individuals had to be maintained in a state of excellent health and when certain communicable diseases had reached specified critical levels. The committee recommended a period of 4 weeks as sufficient to protect against risks of major epidemics and pointed out specific controls that should be observed in administering the drug. The committee concluded its comments, as follows:

This Committee agrees that the results of sulfadiazine prophylaxis may well prove to be as satisfactory as [The] Air Surgeon's memorandum would indicate. It still, however, is opposed to the idea of distributing a powerful drug on a very large scale as a command function unless considerations of importance in regard to the war effort warrant such distribution. It is for this reason that the Committee has taken its position that the indications for sulfadiazine prophylaxis are strategic.

Sulfadiazine prophylaxis admittedly does not control virus diseases, including influenza, and it is not strikingly efficacious against secondary bacterial infections of a mixed character, including pneumococcal infections. In the past two years, meningitis and streptococcal infections, which are most favorably [affected] by sulfadiazine prophylaxis, have not been epidemic in this Theater. Thus when the question is considered in relation to SOS troops in the United Kingdom, the Committee is opposed to sulfadiazine prophylaxis unless the pattern of epidemic disease is materially altered.¹⁰⁵

¹⁰⁴ Annual Report, United Kingdom Base, 1944.

¹⁰⁵ Essential Technical Medical Data, Headquarters, ETOUSA, for September 1944.

The committee voiced no objection against trial use of the drug by the Army Air Forces. It also recommended that a small controlled experiment on the prophylactic use of sulfadiazine be carried out in one or more hospital units of the theater.

Col. Joseph C. Turner, Chief, Medical Services, 154th General Hospital, near Wroughton, England, was selected to conduct the limited study recommended by the committee. He divided half of the hospital's enlisted complement into two experimental groups—one receiving 0.5 gm. of sulfadiazine daily and the other receiving 1.0 gm. daily. The other half served as controls. The Eighth Air Force in England conducted a clinical trial in the prophylactic use of sulfadiazine in four stations of its Air Service Command. There were a few toxic reactions, none severe. However, several Air Force patients who were admitted to hospitals for diseases other than upper respiratory infection became toxic from the additional therapeutic administrations of the drug. Colonel Spruit had to notify all hospitals to ask Air Force patients if they had had experimental doses of sulfadiazine prior to initiation of sulfonamide therapy.¹⁰⁶

The drug trials at the 154th General Hospital and in the Eighth Air Force Air Service Command were continued throughout the winter of 1944–45. In the meantime, TB MED (War Department Technical Bulletin) 112, issued 1 November 1944, authorized the prophylactic use of sulfadiazine at the discretion of the theater commander, under circumstances and by methods practically identical with those previously recommended by the Committee on Infectious Diseases. As a result, sulfadiazine was used prophylactically in other isolated instances with varying results.

In his final report on his experiments, Colonel Turner noted that the results of such tests hinged to a considerable extent on the pattern of disease that chanced to unfold. In this case, the winter proved noteworthy for the rarity of severe diseases of the respiratory tract, and hemolytic streptococcal infection was seldom seen.

"Thus the epidemiological conditions developing in this experiment were not strictly comparable to those obtaining for most groups reported on by others," wrote Colonel Turner. "They set, rather, the question of how sulfadiazine prophylaxis will influence upper respiratory tract disease which is mild and mixed and non-streptococcal in character."

After almost 5 months of trial, Colonel Turner found the answer to this question. He reported: "The incidence of mild upper respiratory infection was about the same for both treated and control groups. Sulfadiazine did not appear to influence the occurrence of colds or of chronic upper respiratory infection."¹⁰⁷

The Air Force study, on the other hand, indicated the following results from use of prophylactic sulfadiazine: (1) A reduction in the noneffective rate due to respiratory disease (patients admitted to hospitals and quarters) as well

¹⁰⁶ See footnote 104, p. 433.

¹⁰⁷ Essential Technical Medical Data, Headquarters, ETOUSA, for April 1945.

as for those treated on a duty status, (2) a similar reduction in the incidence of gonorrhea, and (3) a reduction in the number of individuals that would probably have been affected by a diarrheal outbreak in which the etiologic agent could not be definitely identified. The results were, however, inconclusive with respect to the pneumonias.¹⁰⁸

Diphtheria

As the concentrated attacks on the defenses of the German homeland grew in intensity, more and more prisoners were captured. Together with the increased influx of German prisoners, the first sporadic cases of diphtheria were seen. This had been expected, and the supply of antitoxin was adequate. By mid-October 1944, when Colonels Middleton and Pillsbury made a tour through the medical installations of First and Third U.S. Armies, diphtheria was occurring in increasing numbers among prisoners of war, and cases had appeared in U.S. troops. It was observed that penicillin was proving to be remarkably efficacious in the treatment of diphtheria. To date, it had been used primarily in patients sensitive to foreign serum or in the few instances where antitoxin was not immediately available. Colonel Middleton advised extending the use of penicillin to patients with grave toxemia, for whom the combined administration of diphtheria antitoxin and penicillin might offer a better prospect than antitoxin alone. Colonel Middleton also considered the possibility of penicillin application to the carrier state.

It was necessary first to gather data on the actual efficacy of penicillin in the treatment of diphtheria while discouraging its immediate acceptance as a substitute for antitoxin. To facilitate obtaining this data, the Office of the Chief Surgeon, Headquarters, ETOUSA, issued Administrative Memorandum No. 151, dated 27 November 1944, which furnished advice on the consolidation of information gained from treated cases and which recommended the dosage to be followed. The formula advised was 25,000 units every 2 hours (300,000 units a day) for 7 days. The directive also required prompt reports on cases thus treated.

Next, since early results as to treating diphtheria carriers with penicillin in the foregoing schedule were indeterminate, a more positive and directed study was obviously necessary. Prof. Sir Alexander Fleming of the Penicillin Clinical Trials Committee, British Medical Research Council, advised substituting topical applications for intramuscular injections. He suggested using a suspension of 500 units penicillin per cubic centimeter of normal saline solution or oil as a nebulizer for the nose and throat. In addition, it was proposed that troches containing 500 units of penicillin and capable of solution in the mouth in from 15 to 20 minutes be used.

Lt. Col. (later Col.) Rudolph A. Kocher, MC, Chief, Medical Service, 203d General Hospital, Garches, France, used the spray and troche treatment on 22 diphtheria carriers (all German prisoners of war). During the course of

¹⁰⁸ Report, Eighth Air Force, Office of the Surgeon, 27 Mar. 1945, subject: Prophylactic Use of Sulfadiazine on Eighth Air Force Personnel.

the study, he found it expedient to double the strength of penicillin. The spray was used every 2 hours and the lozenge every hour during the day. The *Corynebacterium diphtheriae* disappeared completely from the cultures of the nose and throat of 14 of the 22 carriers. The remaining eight had badly diseased cryptic tonsils, and there was only irregular, if any, control of the noxious flora with penicillin. Tonsillectomy effected a relief of the carrier state in all eight of these subjects.¹⁰⁹

The problem of diphtheria among U.S. troops was never great in terms of its incidence, but many deaths from diphtheria continued to occur during the remainder of the war. It appeared that a considerable number of these fatalities could have been avoided. The disease now occurred so infrequently in the United States that a new generation of clinicians had arisen who had had no opportunity to become familiar with its various clinical manifestations. There was also blind dependence on laboratory confirmation of the diagnosis, which too frequently delayed its recognition and, for many reasons, was itself not always infallible. Finally, The Surgeon General sent a special commission to study diphtheria in the European theater. Further discussion of the disease must be reserved for that portion of this narrative pertaining to the post-hostilities period, when diphtheria became a matter of relatively greater concern.

Cold Injury

In mid-September 1944, the Allies had attempted to outflank the Siegfried Line at its northern terminus using two U.S. and one British airborne division as the primary assault elements. The massive airborne operation was executed precisely, but, despite the heroic efforts of the British 1st Airborne Division to hold a bridgehead across the Neder Rhine in the vicinity of Arnhem, German defenses were equal to the occasion. The Siegfried Line could not be turned, and the Allied armies along the entire Western Front had to attack the enemy frontally. There was fierce fighting, and progress was slow. Behind the lines, there had to be a tremendous logistical buildup of sufficient proportions to sustain a march to and beyond the Rhine.

Meanwhile, the weather turned cold and wet, presaging the coldest winter in Europe in a number of years (fig. 147). There was a distinct rising trend in the incidence of upper respiratory infections amounting to from 60 to 70 percent of total hospital admissions.¹¹⁰ For the first time since D-day, the armies were now having a preponderance of medical over surgical patients.¹¹¹ In November, the evacuation and hospitalization situation became critical. On two occasions, there was no evacuation from army areas for an 18- to 24-hour period because of a lack of hospital trains and hospital beds on the Continent. On four different occasions during the month, there was no evacuation from the Continent to the United Kingdom, either by sea or air. On 24 November

¹⁰⁹ Essential Technical Medical Data, Headquarters, ETOUSA, for February 1945.

¹¹⁰ Minutes, Chief Surgeon's Consultant Committee Meeting, 27 Oct. 1944.

¹¹¹ Essential Technical Medical Data, Headquarters, ETOUSA, for October 1944.



Figure 117. Aidmen of 91th Division treating injured soldier on typical cold and dreary day, near Tittingen, Germany, 15 January 1945.

1944, the 15th General Hospital was destroyed by V-1 bombs which the Germans were raining into the northern areas of concentration. Five hospital trains destined for the First U.S. Army had to be diverted to evacuate patients from the destroyed general hospital. Another hospital train was derailed and lost to the evacuation effort. For the last 18 days of November, there were no normal beds available in Paris, and at times approximately 4,000 patients lay on cots and litters in corridors, dayrooms, and offices. The appearance of trenchfoot cases in overwhelming numbers placed a critical added strain on the inadequate facilities for evacuation and hospitalization.¹¹²

In mid-December, von Rundstedt launched a vigorous counterattack through the frozen forests of the Ardennes. The Battle of the Bulge had begun. The Germans had been able to muster greater strength than expected, and considerable Allied strength was required to meet it. It was not until late January that the Allies won back all the ground they had lost. At a time when surgical and neuropsychiatric casualties were at their highest, the incidence of cold injury reached epidemic proportions.¹¹³

While prevailing Army practices usually delegated the care of cold injury to the surgeons, the brunt of this care actually fell upon the medical services.

¹¹² Essential Technical Medical Data, Headquarters, ETOUSA, for November 1944.

¹¹³ A complete, comprehensive, and authoritative discussion of cold injury in the European theater is contained in "Medical Department, United States Army, World War II. Cold Injury, Ground Type." Washington, U.S. Government Printing Office, 1958.

In the European theater, it was primarily the number of surgical casualties that naturally diverted this charge to the medical services.¹¹⁴ For example, the 100th General Hospital, Paris, France, during 1944 admitted 1,101 trenchfoot, 20 immersion foot, and 314 frostbite cases to the surgical service, but all except those requiring amputation were cared for by the medical service.¹¹⁵ The 7th General Hospital, Herts, England, in an attempt to equalize the volume of work between medicine and surgery, admitted nearly all cold injury cases to the medical service. These patients were not transferred to the surgical wards except in the event of some complication requiring surgery. In this way, the hospital reported, surgical officers were relieved of a great amount of administrative work and could devote more time to the treatment of battle casualties.

In looking back on this situation, Colonel Kneeland, the United Kingdom Base medical consultant, noted as follows:

In nearly all hospitals within the United Kingdom, trenchfoot was regarded as a medical problem, except in the small percentage of cases with extensive gangrene. With a bed occupancy well above the normal capacity, the problem of treatment and disposition of these cases was a very pressing one. Most of our medical officers were wholly inexperienced in this condition and much of the available technical data dealt with more severe types of cold injury than were occurring on the Western front. Broadly speaking, the majority of cases were relatively mild. Only about 10 percent had gangrene and most of the gangrene was in the form of superficial skin necrosis. In 90 percent of the cases, therefore, one was dealing with soldiers whose skin was intact, who had comparatively few objective signs of cold injury, but who had varying degrees of subjective discomfort.

With a demand for hospital beds on the one hand and a pressing need for infantry riflemen on the other, the disposition of these cases became of the utmost importance. Because of our lack of experience, the medical consultant felt on very insecure ground in giving advice to chiefs of services and it was his duty to obtain experience and create a working hypothesis as rapidly as possible. This was essential for the following reasons—if men were unnecessarily boarded [to the Zone of Interior], loss in manpower would be very serious to the fighting forces, as the great majority of cases occurred in the Infantry; on the other hand, if men were kept in the hospital who could not be returned to duty within the evacuation policy of the theater, the congestion of hospital beds might prove disastrous. It was the duty of the medical consultant, therefore, to frame some sort of coherent policy which could be disseminated to all the hospitals.¹¹⁶

Colonel Middleton was particularly concerned over the lack of information on which to base a theaterwide policy. Speaking about trenchfoot at the 24 November 1944 meeting of the Chief Surgeon's Consultant Committee, he said: "As you all know, not only is this an important problem, the most important single problem in the theater at the present time, but we have no measurements of either injury or of convalescence." At the 30 December 1944 meeting of the committee, Colonel Middleton remarked on the prevailing idea that 50 percent of cold injury cases entering army mobile hospitals were being evacuated to Communications Zone hospitals. Of this 50 percent, anywhere from 5 to 35 percent were being returned to duty. Said Colonel

¹¹⁴ Essential Technical Medical Data, Headquarters, ETOUSA, for December 1944.

¹¹⁵ Annual Report, 100th General Hospital, 1944.

¹¹⁶ Annual Report, United Kingdom Base, 1 Jan. 1945–30 June 1945.



FIGURE 148. Chest respirator used in treatment of cold injury.

Middleton: "It is entirely too wide a variance of the ability, or of the opinion of the surgeon as to the ability to rehabilitate. In considering the work in this particular field, I think it would be very desirable to get some criteria of injury and repair." Colonel Cutler, the theater chief consultant in surgery, replied: "I don't think we have much to say about it yet."

Under the overall guidance of Colonel Kneeland, Capt. (later Lt. Col.) Robert A. Kennedy, MC, 125th General Hospital, Dorsetshire, England, was placed on temporary duty at the 7th General Hospital to conduct studies there under the supervision of Lt. Col. (later Col.) Laurence B. Ellis, MC. Captain Kennedy had had considerable experience in treating cold injury on Attu and had devised a respirator for the treatment of cold injury cases (fig. 148). Colonel Ellis was an experienced physiologist and thoroughly acquainted with experimental techniques in physiology.

The basic principle of Captain Kennedy's procedure was to cause hyperventilation through negative pressure applied to the thorax encased in an aluminum jacket. His hypothesis was that such negative pressure, transmitted to the thoracic cavity, would tend to improve venous and probably lymphatic flow from the extremities. This, in turn, would improve the oxygen supply to the damaged tissues of the feet as well as diminish the edema of these parts.

Supply difficulties, particularly in obtaining the exact type of respirator, prevented experimentation on as extensive a scale as would have been desirable. Nevertheless, early results were favorable, and patients treated in the respirator improved at a more rapid rate both subjectively and objectively than patients treated by other methods. Physiologic studies of the

circulation of patients under treatment were initiated to obtain information on the mechanism of the respirator's action and on the pathologic physiology of the injury itself. Measurements of the femoral venous pressure showed an immediate and significant drop when the apparatus was in action.¹¹⁷ Later findings were an interesting commentary upon the deeper order of the pathologic changes. Relapses occurred in convalescent patients, and patients with deeper cold injuries experienced considerable pain when the respirator was used.¹¹⁸

The study was continued until April 1945. It was completed under the direction of Capt. (later Maj.) Mark Aisner, MC, who had previously assisted Captain Kennedy. In general, the conclusion was that this type of apparatus was of value in reducing the edema and symptoms of patients in the acute stage of cold injury, especially within the first 2 or 3 weeks after development of trenchfoot. The hospital stay of patients in this category so treated was definitely shortened, and a larger number of them returned to duty; but, in gross numbers, the method could not be considered as having been of importance during the trenchfoot epidemic. Furthermore, patients with pure frost-bite and those severe cases not treated until after the third or fourth week showed little or no permanent response. Valuable information was obtained as to the effects of the treatment on peripheral circulation and its usefulness in the treatment of trenchfoot.¹¹⁹

Another study begun in November 1944 was to have more immediate effect in the treatment of cold injury. At the 110th Station Hospital, Lt. Col. (later Col.) Theodore Golden, MC, thought that if he were to take a group of 25 patients and exercise them as soon as possible, he could rehabilitate them faster. He found that 5 weeks after exposure all 25 patients could actively engage in some work around the hospital and 12 of the group could complete a 5-mile march. Colonel Middleton reported these encouraging findings at the 30 December 1944 meeting of the Chief Surgeon's Consultant Committee. General Hawley wanted to know how serious the injury was. Colonel Kneeland explained that, on the whole, he would say the injury was of somewhat more than average seriousness. There were several patients with gangrene, but now all were walking. Colonel Cutler, in confirmation, made the following statement:

In connection with the findings of those cases described by Colonel Middleton at the 110th, many times there are necrotic areas on the skin which appear as black, dry gangrene, but time has shown that in many cases this is very superficial. The foot we have studied, microscopically, which came off a man who died of pneumonia not trenchfoot revealed that the deeper tissues were in pretty good shape and that the superficial damage was to the capillaries. This is in line with the studies by Colonel Golden and his group at the 110th SH who have revealed a high rate of recovery under exercise as the chief therapeutic agent.

As a result of these and other similar studies,¹²⁰ it soon became obvious that most cold injury cases could be returned to duty within from 6 to 8 weeks

¹¹⁷ Annual Report, 7th General Hospital, 1944.

¹¹⁸ See footnote 114, p. 438.

¹¹⁹ (1) Semiannual Report, 7th General Hospital, 1 Jan. 1945-30 June 1945. (2) See footnote 116, p. 438.

¹²⁰ See footnote 113, p. 437.

if proper physical training was started early enough. Such treatment became routine. The 188th General Hospital in Gloucestershire, England, reported that, after such a period of observation and rehabilitation, 90 percent of the patients suffering from trenchfoot, frostbite, and exposure were returned to either full or limited duty.¹²¹ In summary, Colonel Kneeland wrote:

Material aid was given by Lt. Col. Theodore Golden of the 110th Station Hospital, Lt. Col. Laurence B. Ellis of the 7th General Hospital, and Lt. Col. Samuel Millman of the 188th General Hospital. These three officers conducted active programs of investigation and treatment in connection with trenchfoot and, as a result of their experience, the Consultant in Medicine was able to say, with some assurance, that the majority of trenchfoot cases could be returned to some form of duty in the theater, provided that active muscular rehabilitation was started as early as possible. This point of view was disseminated to the various hospitals through the hospital center consultants in medicine and it was believed worthwhile and undoubtedly responsible for the conservation of manpower. More, this active program resulted in a diminution in the disability of those who could not be returned to duty. Trenchfoot was far and away the most important medical problem of the winter.

When General Morgan visited the theater in February 1945, he brought a plan for the study of heparin in Pitkin menstruum in the treatment of trenchfoot. A tentative plan was established to treat 50 patients with third-degree changes. These patients were to be selected from three different armies. However, a sudden change in the weather lowered the incidence of cold injury before that treatment plan could be effected.

Although the load of cold injury cases receded dramatically with the advent of spring, problems concerning patients with cold injury did not stop there. There was the dermatologic problem of the subsequent fate of cold injury patients which Colonel Pillsbury, the theater senior consultant in dermatology, found reason to be concerned about. He felt that these soldiers had altered skin, were subject to macerated states, and were more susceptible to trichophytosis. There were also those soldiers who continued to use the sequelae of cold injury as an illegitimate basis for release from forward duty. Finally, there was the smaller number of cases resulting from some soldiers' neglect of their cold injury during the past winter. These were stout soldiers who had resisted evacuation during the strenuous fighting of the Bulge but whose painful feet had finally led them to seek medical attention. They showed extreme vascular changes and, usually, had cold, clammy, blue feet with or without edema.¹²²

Homologous Serum Jaundice

In late autumn of 1944, Capt. (later Maj.) Harold S. Ginsberg, MC, 7th General Hospital, called Colonel Kneeland's attention to 14 jaundice cases occurring at that hospital. Each patient had received plasma some months prior to the development of jaundice, and some had received whole blood as well. Since the incidence of infectious hepatitis was low at the time, Captain

¹²¹ Annual Report, 188th General Hospital, 1 Jan. 1945-31 May 1945.

¹²² Essential Technical Medical Data, Headquarters, ETOUSA, for April 1945.

Ginsberg suggested that the condition under scrutiny might be homologous serum jaundice. Accordingly, Colonel Kneeland requested that the hospital center consultants collect data concerning jaundice cases in the United Kingdom.¹²³

At the 30 December 1944 meeting of the Chief Surgeon's Consultant Committee, Colonel Kneeland reported there had been nine cases of severe hepatitis at the 316th Station Hospital. Four of the patients had died. All the patients had received plasma, and seven of them had received blood transfusions.

Lt. Col. John B. McKee, MC, the Ninth U.S. Army medical consultant, at a meeting of the Medical Subcommittee held on 21 February 1945, expressed the opinion that transfusion reactions were more common than was supposed. He thought that not all cases were being reported, particularly those occurring in field hospitals. There was growing suspicion that these transfusion reactions tended to occur when the blood used was over 14 days old. Colonel McKee said that investigation was continuing.

By 1 March 1945, 49 hospitals had reported to Colonel Kneeland. Nine hospitals reported no cases; the remaining hospitals reported a total of 281 cases of jaundice. These cases were surgical patients in whom the jaundiced condition had developed from 45 to 100 days after they had received blood or plasma. Twenty-one of these patients had died. Unfortunately, there were complete records on only 146 of these 281 cases. An analysis of these 146 revealed that 14 had died, a mortality of about 10 percent. Fatal cases invariably had a duration of only from 4 to 10 days after onset. The data strongly indicated that plasma was the source of infection. Accordingly, Colonel Kneeland conferred with Colonel Muckenfuss and Doctor Bradley, British Ministry of Health and a member of the Jaundice Committee of the Medical Research Council.

Doctor Bradley brought forth statistics on the occurrence of homologous serum jaundice in British troops confirming Colonel Kneeland's findings which implicated plasma as the carrier of the icterogenic agent. Both Colonel Muckenfuss and Doctor Bradley believed that detailed study of the problem required tracing the plasma to its source. Admittedly, this was an impossibility in ETOUSA. The only recourse was to continue to gather more data so that the facts could not be questioned.

When General Morgan visited the theater in February and March 1945, he was apprised of the situation. The disease suggested a serious problem for the Zone of Interior hospitals in view of the excessively long incubation period. The medical officers who were concerned in the investigation of homologous serum jaundice in the European theater thought that the subsequent recognition of the disease in Zone of Interior hospitals and the studies made there were due in part to their early identification of the widespread incidence of the disease.

¹²³ (1) Letter, Office of the Surgeon, United Kingdom Base, to Chief Surgeon, ETOUSA, 1 Apr. 1945, subject: Study of Homologous Serum Jaundice. (2) See footnotes 119 (1) p. 440, and 116, p. 438.

At about this time, there was a precipitous rise in the incidence of infectious hepatitis. Approximately 1,000 cases occurred in February. For the weeks ending on 23 and 30 March, there were 952 and 892 cases, respectively. In the first two weeks of April, 965 cases occurred the first week and 979 cases occurred the second.¹²⁴ Some medical officers thought there was a direct relationship between presumptive homologous serum jaundice and naturally occurring infectious hepatitis. These officers pointed to the closely corresponding curves of incidence. Colonel Kneeland found that not only the curve of incidence but the gravity of jaundice among wounded patients was much greater than for any other group.¹²⁵

Tuberculosis

Throughout most of the period of continuous heavy fighting, the incidence of tuberculosis in the U.S. Army in Europe continued to remain low. Hospital admission rates for tuberculosis for all troops were, in fact, at their lowest since the activation of the theater, although the incidence of tuberculosis among nurses showed a persistent increase. In the last months of the war, however, this picture was to change dramatically.

Colonel Badger had an opportunity to confer with Col. Esmond R. Long at the Office of the Surgeon General in October 1944 on policies of the European theater as expressed in Administrative Memorandum No. 22 and Circular Letter No. 100, pertaining to the evacuation of tuberculosis patients from the European theater to the Zone of Interior (pp. 412 and 431). Colonel Long considered these directives well adapted to the needs of the European theater and thought that, through them, diagnosis, treatment, disposition, and evacuation were both simplified and expedited.¹²⁶

In addition, Colonel Badger looked into the possibility of obtaining mobile miniature X-ray units for use in the theater. After conferences with X-ray and supply personnel in the Office of the Surgeon General, it was apparent that these units were impractical for use in the United Kingdom or on the Continent for a variety of reasons. The British 35-mm. mobile unit was, by comparison, a more workable outfit with value in spot-survey work as contemplated for the European theater.¹²⁷

Just previous to Colonel Badger's departure for temporary duty in the Zone of Interior, there came to light eight cases of active pulmonary tuberculosis in the 56th Fighter Group, Eighth Air Force, between August 1943 and September 1944. There was also one acute case in the 78th Fighter Group, Eighth Air Force. This brought the suggestion from Colonel Badger that all personnel of these and associated units be examined by X-ray. This suggestion was executed by Colonel Kneeland in Colonel Badger's absence by authority of Col. Joseph H. McNinch, MC, Deputy Surgeon, United Kingdom Base.¹²⁸

¹²⁴ See footnote 122, p. 441.

¹²⁵ Essential Technical Medical Data, Headquarters, ETOUSA, for March 1945.

¹²⁶ Annual Report, Senior Consultant in Tuberculosis, ETOUSA, 1944.

¹²⁷ Ibid.

¹²⁸ Letter, Office of the Surgeon, Headquarters, United Kingdom Base, to Commanding Officer, 163d General Hospital, 6 Oct. 1944, subject: Survey of Tuberculosis in the Eighth Air Force.

The chest X-ray surveys of the 78th and 56th Fighter Groups were carried out at the 163d General Hospital near Cambridge, England.¹²⁹ In the survey of the 78th Fighter Group conducted by Capt. (later Lt. Col.) James S. Mansfield, MC, with Capt. (later Maj.) James P. Palmer, MC, seven cases of active tuberculosis were discovered and boarded for return to the Zone of Interior. Captain Mansfield and Capt. (later Lt. Col.) Peter Zanca, MC, carried out the survey of the 56th Fighter Group, and found one case of active tuberculosis with positive sputum. Over 3,600 chest films were taken and read at the 163d General Hospital during October and November 1944.

It was concluded from these two surveys by Captain Mansfield and his associates, that no common source of infection could be found for the total of 17 cases of pulmonary tuberculosis discovered in these two fighter groups, 9 cases prior to the surveys and 8 cases as a result of the surveys. All of the cases were regarded as reactivation of previously existing pulmonary tuberculosis.¹³⁰

Shortly after his return to the theater, Colonel Badger was assigned as Consultant in Medicine, Normandy Base Section, while still retaining his position as theater senior consultant in tuberculosis. In February 1945, he submitted, for study by the Chief Surgeon's staff, recommendations for a tuberculosis survey at the end of hostilities of all personnel who had been in the theater for longer than 8 months. Next, he prepared a circular letter to formalize procedures for the followup of contacts with active cases of tuberculosis.

This circular letter was published on 8 April 1945 by the Office of the Chief Surgeon, Headquarters, ETOUSA, as Circular Letter No. 38. It required the first hospital in the chain of evacuation making the diagnosis of tuberculosis to notify both the patient's unit and the Chief Surgeon, ETOUSA, of the fact. The European theater Follow-up Card (medical) (p. 251) was to be used for this purpose. The tactical situation permitting, the circular letter required examinations of all contacts, that is, persons who had been in frequent close association with the afflicted individual. This circular letter assured proper followup examination and provided a simple and efficient method of noting cases and trends of active pulmonary tuberculosis as they occurred.

Recovered Soviet prisoners of war.—Meanwhile, the Third U.S. Army had recovered a group of Soviet prisoners of war at Sarreguemines in December 1944 (fig. 149). These Soviet soldiers had been captured by the Germans between May 1941 and May 1943 in the Black Sea area and in the Ukraine. After being shifted around from camp to camp in Germany as labor battalions, they had finally been sent to the mines in the Metz, Bitche, and Sarreguemines areas. Here, they had worked 12 or more hours daily with 1 day off a month when the coal-mining quota was filled. The men had been worked to the point

¹²⁹ (1) Report, 163d General Hospital, 22 Oct. 1944, subject: Tuberculosis Survey of 78th Fighter Group, 8th Air Force, and Attached Units. (2) Report, 163d General Hospital, 16 Nov. 1944, subject: Tuberculosis Survey of the 56th Fighter Group, 8th Air Force, and Attached Units.

¹³⁰ Letter, T. L. Badger, to Col. J. B. Coates, Jr., 8 July 1956, subject: Corrections and Additions to Manuscript.



FIGURE 149. Soviet soldiers, prisoners of Germans freed by Third U.S. Army, partaking of emergency rations rushed to them by liberating U.S. forces, Sarreguemines area, France.

of collapse, and, if they collapsed or relaxed their strenuous labors, they had been beaten and whipped. They had worked and slept without change of clothing. Sanitary conditions had been most primitive. Food had consisted of a steady diet of bread and tea for breakfast, thin turnip soup for dinner, and turnip soup for supper, with no bread at dinner or supper time. Potatoes had been given once a week on Sundays, and only once monthly had a small piece of horsemeat been included for dinner. In some camps or sections, there had been only two meals a day.¹¹

Shortly before being overrun by the Third U.S. Army, the Germans had gathered together all the sick in a hospital near Sarreguemines. Here, these patients were found by the Third U.S. Army and evacuated to the 50th General Hospital, Commercy, France, arriving there on 18 December 1944, and totaling, eventually, 325. Before capture by the Germans, the men were said to have been in excellent physical condition. Some had been in the Soviet Army for only a few months before capture. When they arrived at the 50th General Hospital, 307 were in a moribund or seriously ill condition, 16 were in fair condition, and only 2 were in a relatively good physical state. They were dehydrated, emaciated, and covered with all types of lice. There were severe beriberi, emaciation in marked degree, and all stages of avitaminosis. There

¹¹ "The German Prisoners of War," *Medical Department, Third U.S. Army, Report of the Surgeon General, 1944-1945*, 1945, 10-11.

was generalized edema, and, in many, starvation bellies. Of the total 325, there were 136 who were diagnosed as having terminal pulmonary tuberculosis with severe malnutrition and marked avitaminosis; 78 had far-advanced pulmonary tuberculosis with severe malnutrition; 40 had minimal, moderately advanced and extrapulmonary tuberculosis, malnutrition, and avitaminosis; and 71 had injuries and diseases other than tuberculosis with malnutrition and avitaminosis.¹³²

The hospital initiated immediate measures to save life. Copious amounts of blood, plasma, glucose, and saline solutions were given. There were 170 pneumothorax treatments in 25 cases with hemoptysis, and there were 34 thoracenteses with aspiration in 15 cases with empyema or effusion. In spite of these measures, 28 patients died within a week after arrival, and 4 had expired en route to the hospital.

Most of these patients remained at the 50th General Hospital throughout the first half of 1945. This was an isolated incident which was not to be repeated for another 3 months but which remained a local problem until March 1945. These Soviet prisoners had been recovered in a precariously held bridgehead across the Saar at the very apex of the Third U.S. Army's advance. While they were being evacuated to the 50th General Hospital, the main effort of the German winter offensive had struck some 100 miles to the northwest, stopping further advance by the Allies in this area during most of the approaching winter. Had the German counteroffensive struck a few days earlier, these prisoners might not have been recovered at this time. This unique problem which presented itself at the 50th General Hospital was greatly overshadowed by the more pressing medical problems of the winter.

In March, however, when the Allies were once again sending the reeling German Army behind the protective banks of the Rhine, there was a sudden influx of recovered Allied military personnel and displaced persons (fig. 150). The brunt of the evacuation fell on the 28th and 57th Field Hospitals and the 180th and 35th Station Hospitals, mostly in the Continental Advance Section and Oise Base Section of the Communications Zone. Col. Richard M. McKean, MC, medical consultant for Oise Base Section, reported that the 35th Station Hospital had found 123 cases of active tuberculosis and 80 suspects in 373 dislocated nationals.¹³³ The immediate concern was for the protection of American personnel in the receiving hospitals. Colonel Badger thought that the European theater *Medical Bulletin* would be the most appropriate medium to warn the greatest number of medical personnel of the existing dangers. His article, published in the April 1945 edition, read in part, as follows:

German prisoners of war, allied nationals, especially the Russians subjected to years of forced labor, are coming to us as patients with advanced tuberculosis presenting very strongly positive sputa. These individuals are significant sources of contagion and all hospital personnel having responsibility for their care need adequate protection from these virulent forms of tuberculosis.

¹³² See footnote 131, p. 445.

¹³³ Minutes, Chief Surgeon's Consultant Committee Meeting, 22 Mar. 1945.



FIGURE 150.—Recovered French personnel flying the Tricolor as elements of U.S. Army prepare them for return to France.

It is the task of every medical officer and nurse to leave no stone unturned in efforts to control tuberculosis. Spread of the disease by airborne routes as well as by contact sets the pattern of control. Surely no one would dry-sweep or dust a floor where tubercle bacilli wait impatiently to be spread around. No one would associate with the tuberculosis patient without closing off the very source of infection itself by a mask to baffle the bacillus. No one would be so casual as to infect "clean" areas of a ward with objects contaminated from contact with these highly contagious cases. No unit medical officer would wish to remain in ignorance of tuberculosis diagnosed along the line of evacuation in one of his men; for only by notification of such cases is he alerted to the special danger for the protection of others. Patients not trained in the art of safeguarding others need indoctrination in the technique. The education of the tuberculosis individual concerning the nature of his disease begins early. The vigilance of the medical officer in its early diagnosis and prevention never ceases.

On 1 March 1945, orders were received at the 46th General Hospital, Besancon, France, to prepare to admit 1,200 newly liberated Soviet patients, who were to arrive at the rate of one train load per day for 4 days. No other information was available except that they were to be predominantly medical cases. The 46th General Hospital (fig. 151) summarized its experiences with these patients in its annual report for 1 January through 30 June 1945, as follows:

The patients arrived by trainloads, and it was discovered that there were not only Russian soldiers and civilians but personnel from most of the countries of Europe. Also, the Russians came from all parts of that country: the large cities of Moscow, Leningrad,



FIGURE 151. Consultation of a patient with a medical consultant. (A) Preoperative consultation. (B) X-ray consultation.



FIGURE 151 Continued. C. Patient seriously ill with tuberculosis. D. Pneumothorax treatment.

and Stalingrad; the Ural Mountains; Turkestan; Siberia; and even Mongolia * * *. All these had to be helped and treated without the medium of language. Signs were the only help, and in many instances these were misunderstood.

During the months of March and April, 2,472 Russians, 41 Poles, and 128 Yugoslavs were admitted * * *. Of the civilians, some were boys of 15 and others were old men of 65 * * *. The Hospital Staff was aghast at the terrible physical condition of these people.

Because a great number of these patients had infectious diseases, it was necessary to practice isolation techniques and maintain proper sanitary conditions in the area. This was a problem equalling or surpassing that of language. Our conceptions of modern sanitation were unknown to them * * *. Then, because of their starvation experiences, the patients would hoard any food they could lay hands on * * *.

The majority of these patients arrived with either no medical records or with records so incomplete as to be practically valueless. (One complete train arrived with E.M.T.'s marked F.U.O. in all cases.) Names had to be spelled phonetically, and on 16 March, with the last trainload, rosters of patients who had been sent to this unit before arrived. Since the patients had been previously reported under the name listed on the roster, it was felt that our records should be brought into agreement. This required hours of careful checking and correcting of records.

With the arrival of the 78th Russian Citizen Regroupment Center (18 officers and 43 enlisted men) every effort was made to work through them * * *. Patients ready for duty were evacuated weekly through the Provost Marshal or G-5 channels. On 5 June, two U.S. Hospital Trains evacuated over 500 long-term hospitalization cases.

Hundreds of lives have been saved by the care given them; many have doubled their weight, and have changed from listless hungry animals to almost child-like, playful human beings. Discipline, which was such a great problem at first because of the restrictions necessary for their proper care, is greatly improved because of understanding through constant education. It is felt that as these patients leave the 46th General Hospital and return to their native land, there will go with them a spirit of thankfulness and appreciation for the work done for them.

By the end of March 1945, Colonel Badger had inspected the 57th Field Hospital and the 46th and 50th General Hospitals, and had made recommendations concerning changes in treatment and tightening up of general control measures. He commended the 50th General Hospital for its excellent handling of a very difficult and dangerous situation and noted particularly the good progress which had been made at this hospital in the treatment of recovered Soviet prisoners of war.¹³⁴

The patients at the 46th General Hospital had only recently arrived and that hospital was still in the throes of establishing routine measures for handling the problem (fig. 152) when, in addition to the treatment and control measures described elsewhere, Colonel Badger also made the following specific recommendations for contacts:

1. It is felt that the seriousness of contact with this group of cases of far advanced tuberculosis is such that personnel of the hospitals who have been associated with their evacuation to the 46th General Hospital should be X-rayed at the present time and re-X-rayed every three months a year.

2. Personnel of the 46th General Hospital have all been X-rayed and it is recommended that they should be re-X-rayed on a three-monthly basis as a routine or more often if they present signs or symptoms suggestive of underlying tuberculous pathology.

¹³⁴ Letter, Senior Consultant in Tuberculosis, ETOUSA, to Office of the Chief Surgeon, Headquarters, ETOUSA, attention: Chief Medical Consultant, 3 Apr. 1945, subject: Tuberculosis Among Russian RAMP's at 50th General Hospital.

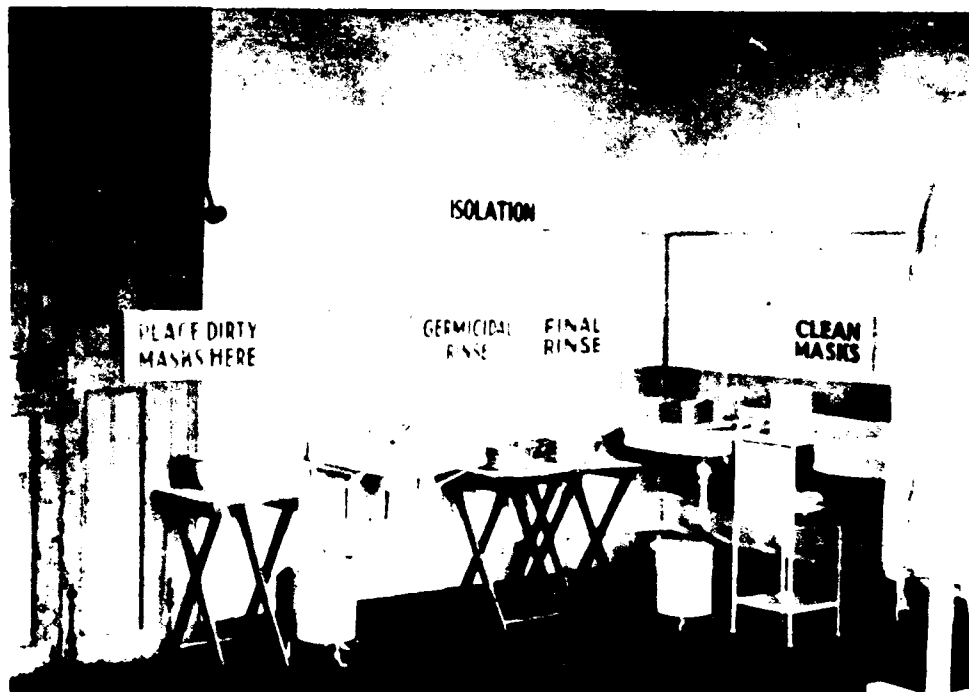


FIGURE 152. Routine control measures at 46th General Hospital. Aseptic setup in isolation wards.

3. It is recommended that every measure be undertaken which will diminish the spread of infection from these highly contagious patients. Further, personnel of this sort will undoubtedly be recovered and it is recommended that they be transferred at the earliest moment by the shortest route, entailing the least number of contacts, to their final hospitalization place.

4. Groups of recovered personnel present a serious tuberculosis problem and should not be sent to any institution without adequate warning of their arrival in order that resources may be assembled for the institution of proper measures of prevention and a technique which will prevent as much spread of the disease as possible.¹³⁵

On 19 April 1945, Colonel Long arrived in the European theater. With Colonel Badger, he reviewed the procedures which had, by now, been fairly well stabilized in all installations where tuberculous patients were being treated. The two officers visited the 50th General Hospital on 6 May 1945 and the 46th General Hospital on 10 May 1945. At these two hospitals, where the great majority of these cases had been assembled, Colonel Badger noted that the patients had made remarkable progress and, except for those seriously ill with advancing disease, their physical condition was excellent. Previously recommended control measures were being carried out meticulously, although discipline still presented a problem at the 46th General Hospital.¹³⁶

¹³⁵ Letter, Senior Consultant in Tuberculosis, ETOUSA, to Chief Surgeon, ETOUSA, attention: Col. W. S. Middleton and Surgeon, Oise Section, 30 Mar. 1945, subject: Tuberculosis in Russian RAMP at the 46th General Hospital.

¹³⁶ (1) Letter, Senior Consultant in Tuberculosis, ETOUSA, to Office of the Chief Surgeon, Headquarters, ETOUSA, attention: Chief Medical Consultant, 13 May 1945, subject: Report of Survey of 46th General Hospital Concerning the Care of Tuberculosis. (2) Letter, Senior Consultant in Tuberculosis, ETOUSA, to Office of the Chief Surgeon, Headquarters, ETOUSA, attention: Chief Medical Consultant, 19 May 1945, subject: Survey of Russian RAMP's 50th General Hospital.

Soon, a similar problem of equal proportions came to light. In early April, the Third U.S. Army uncovered a notorious concentration camp, Buchenwald. This was only the first of such camps the Third U.S. Army was to uncover in rapid succession during its dash across central Germany into Austria and Czechoslovakia. Approximately 21,000 persons were in the camp when it was overrun. They were living under most horrible conditions, and it was estimated that the ill numbered 5,000. The 120th Evacuation Hospital, newly arrived in the army area, was dispatched on 15 April to provide medical service for them. This unit, plus a clearing platoon, operated for about 10 days until relieved by units of the First U.S. Army.¹³⁷

The 45th Evacuation Hospital, under command of Col. Abner Zehm, MC, took over where the 628th Clearing Company and the 120th Evacuation Hospital were forced to leave off. Under the able direction of its commanding officer, this hospital rapidly established aseptic techniques for processing large numbers of tuberculous patients that would have been a credit to any sanatorium in the United States.¹³⁸ Neither the limitations of space nor the scope of this chapter permit a discussion of the appalling conditions that were found at this and other concentration camps, nor would a few words do justice to the exemplary manner in which the problem was managed (fig. 153). Suffice it to say that, from the administrative point of view, it was initially a job for the armies, then a charge to the forward echelons of the Communications Zone, and later a longer term responsibility of military government. In the final analysis, it was a problem for the German people themselves who had permitted the situation to exist and to whom rightfully belonged the obligation to rectify this affront to civilization and humanity. Although it was a great problem in its early stages to the medical service of the U.S. Army, every effort was made to have German facilities accept this obligation at the earliest opportunity.

Recovered United States prisoners of war.—To complicate further the patient-load problems that beset each army on the front as a result of great numbers of prisoners of war, recovered Allied personnel, displaced persons, and refugees suddenly becoming their wards, there was also the happy reunion of advancing U.S. forces with their fellow soldiers who had been held captive by the Germans (fig. 154). As the Allies struck deeper into Germany, U.S. prisoners of war were recovered, sometimes by the thousands. Most of them were eventually evacuated through the Normandy Base Section. This base section had designated Camp Lucky Strike as the reception center for these returned prisoners. Here, the 77th Field Hospital was opened on 8 April 1945 with an initial 350-bed capacity. Patients came in such great numbers, however, that its capacity had to be enlarged to 1,000 beds by augmenting the 77th Field Hospital with the 306th General Hospital (operating during this period

¹³⁷ Annual Report, Third U.S. Army, 1 Jan. 1945–30 June 1945.

¹³⁸ (1) See footnote 136, p.451. (2) The Annual Report, 45th Evacuation Hospital, 1 Jan. 1945–30 June 1945, contains a full and detailed description of the unit's activities at Buchenwald camp.

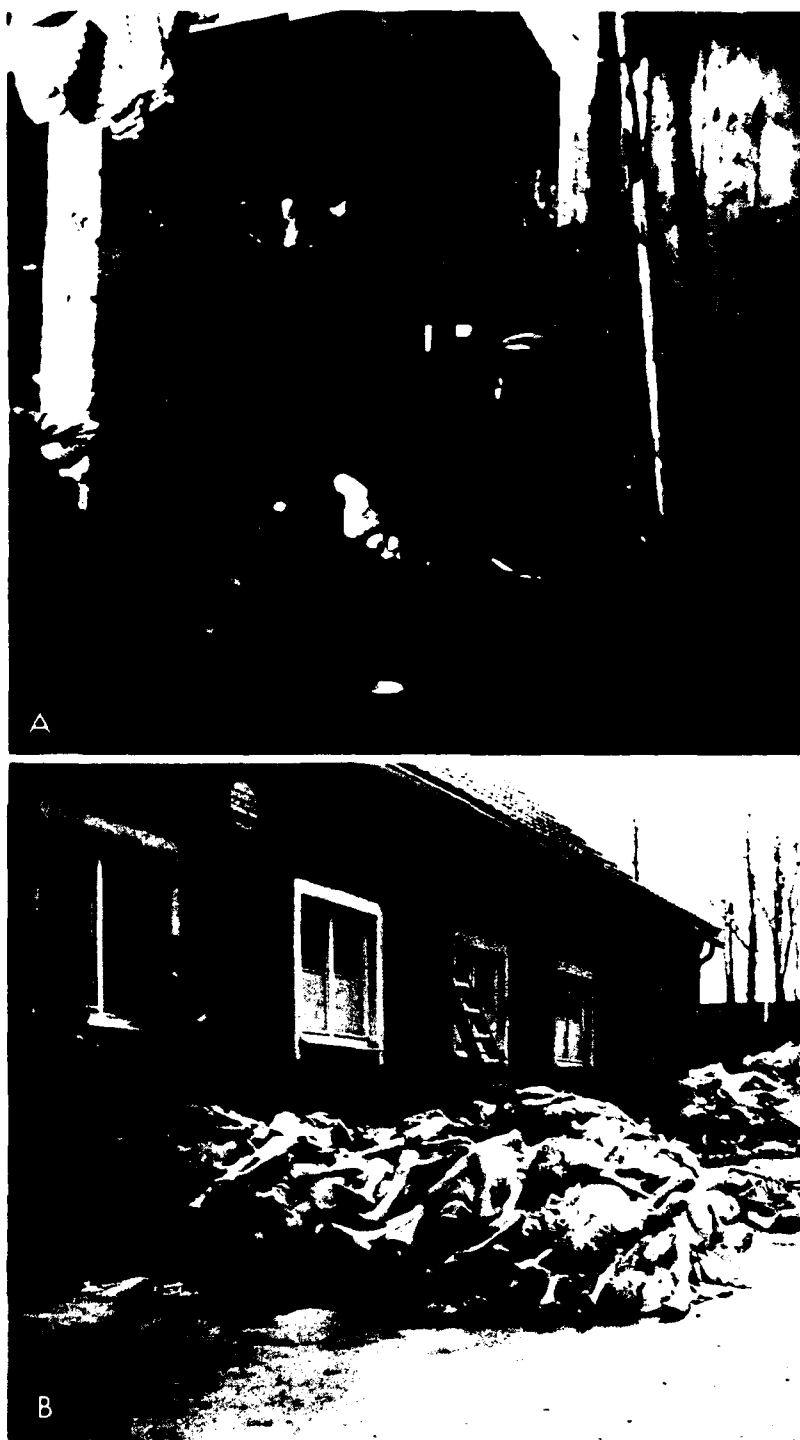


FIGURE 153. -Notorious Buchenwald. A. The so-called "hospital" as found by liberating forces. B. One of the piles of dead awaiting cremation found upon liberation of Buchenwald.

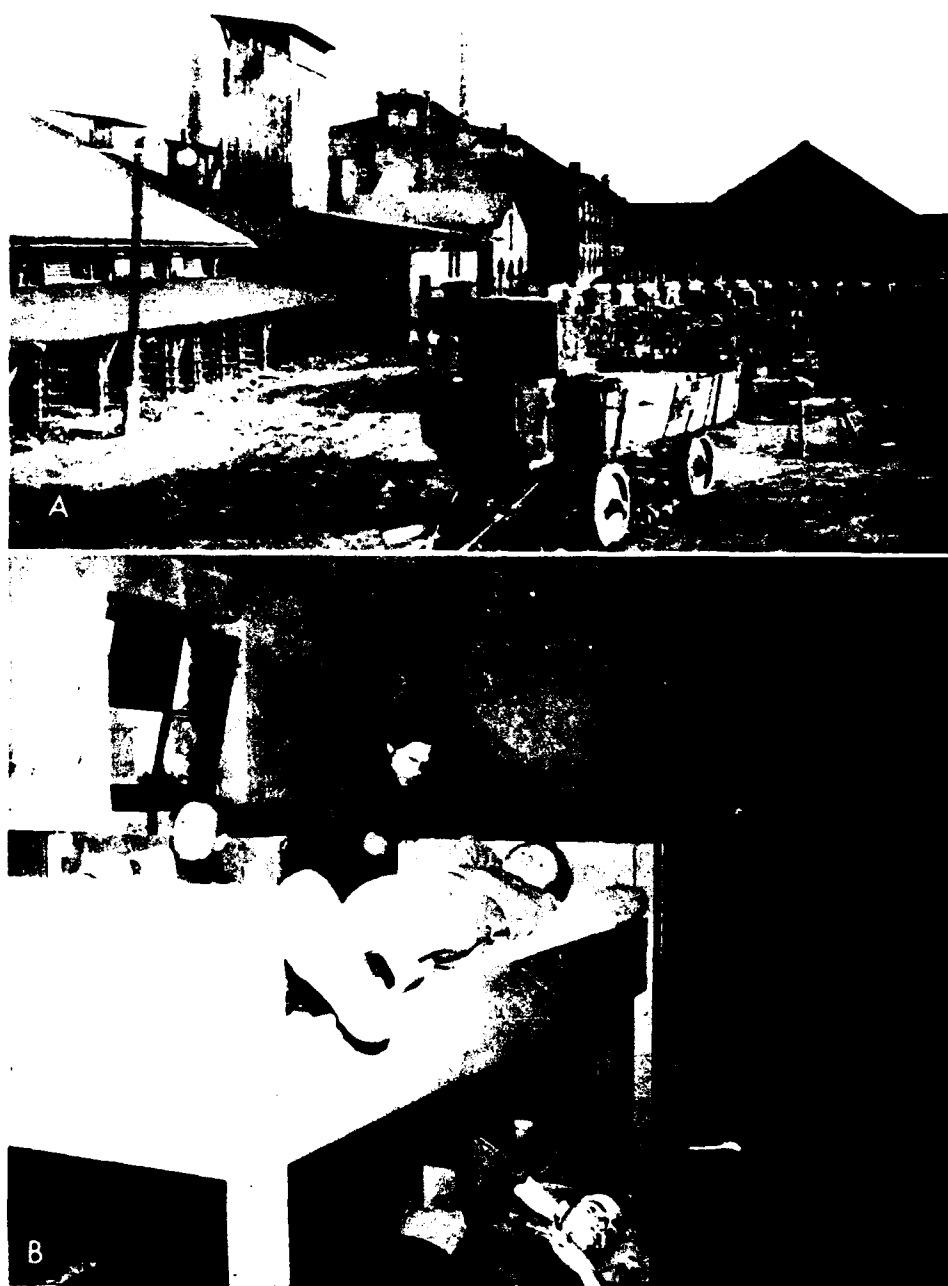


FIGURE 151. American and British prisoners recovered at a German brick factory.
A. Exterior of factory. B. Living conditions.



FIGURE 151. Continued. C. Opening rations brought in to them by liberating forces.

as a convalescent annex). Approximately 18 percent of the first 12,000 recovered personnel to arrive had to be hospitalized, but in May this rate dropped to 3½ percent of those coming through the camp. Nevertheless, the hospital capacity had to be expanded to 1,500 beds. The primary cause for hospitalization, in the early groups of returnees, was malnutrition, primary or complicated.¹⁰⁹

Routine roentgenograms were made only in cases requiring hospitalization. The preliminary data, complicated as they were by many unknown factors, indicated that the incidence of tuberculosis was nearly 8 times that of U.S. troops in 1943.¹¹⁰ A more detailed discussion of tuberculosis as observed in recovered U.S. prisoners of war may be found elsewhere.¹¹¹

Colonel Badger, in his role as medical consultant in Normandy Base Section, called the attention of General Hawley and his consultant staff to serious protein-deficient states occurring in patients, particularly in those with maxillofacial and other traumatic injuries preventing normal ingestion of food (fig. 155). He indicated that the intravenous use of plasma in large doses (at least 4 units daily) could overcome these deficiencies but that there was a

¹⁰⁹ Annual Report, Normandy Base Section, 1 Jan. 1945-30 June 1945.

¹¹⁰ Annual Report, Senior Consultant in Tuberculosis, ETOUSA, 1 Jan. 1945-30 June 1945.

¹¹¹ (1) See footnote 72 (2), p. 103. (2) Cohen, B. M., and Cooper, M. Z.: A Follow-Up Study of World War II Prisoners of War. Washington, U.S. Government Printing Office, 1951. (3) Medical Department, United States Army, Preventive Medicine in World War II. Volume IV, Communicable Diseases Transmitted Chiefly Through Respiratory and Alimentary Tracts. Washington, U.S. Government Printing Office, 1958. (4) Medical Department, United States Army, Internal Medicine in World War II. Volume II, Infectious Diseases. [In preparation.]

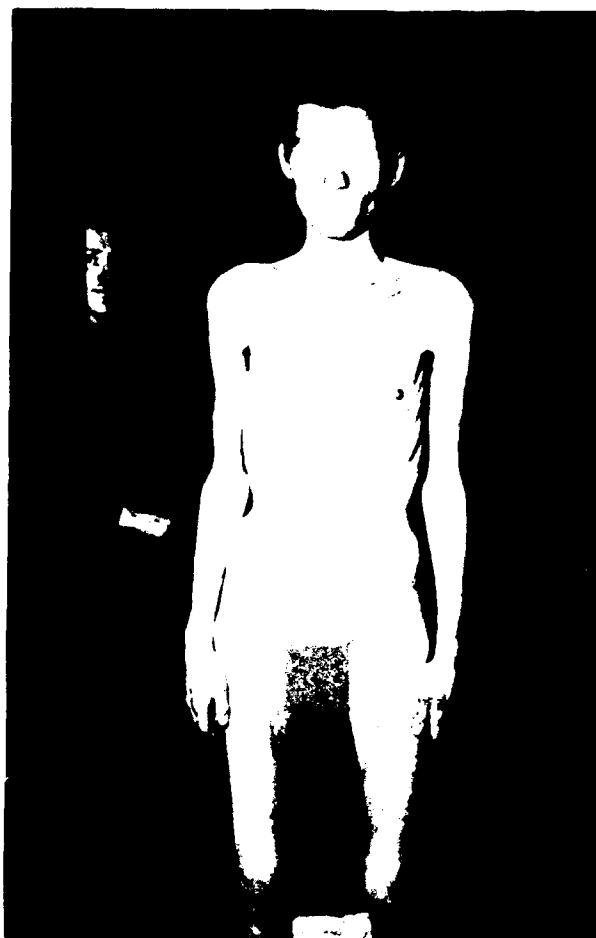


FIGURE 155.— Malnutrition in a recovered Allied soldier.

common tendency to use inadequate supplies of plasma. He also noted the scarcity of intravenous protein solutions. In fact, Colonel Badger stated, at the March meeting of the Chief Surgeon's Consultant Committee, that the 60 bottles of intravenous protein in his possession represented all there was in the theater. Circular Letter No. 36, dated 19 April 1945, Office of the Chief Surgeon, Headquarters, ETOUSA, outlined the program for the nutritional management of malnourished recovered Allied military personnel and provided for the intravenous administration of 4 units of plasma and 500 cc. of whole blood in 24 hours to patients with edema who could not tolerate food by mouth.

When the first groups of recovered U.S. prisoners of war came into Camp Lucky Strike, their nutritional management was already well planned. The ragged, dishevelled, and emaciated men responded well to treatment. Severely ill patients unable to take nourishment by mouth showed remarkable response to slowly increasing quantities of plasma administered intravenously. The very slow administration by the constant drip technique of a high-protein diet in liquid form by nasal catheter through the stomach also gave excellent results.

The proportion of primary nutritional deficiencies was greatly diminished in those arriving during May 1945, and respiratory infections and minor injuries predominated as causes for admission.¹⁴²

FROM V-E DAY TO V-J DAY

The war in Europe ended when emissaries of the German High Command signed a document of unconditional surrender in the early morning hours of 8 May 1945. In anticipation of this memorable event, a number of changes had taken place as regards medicine. General Hawley's office announced, in late April, that, effective 1 May 1945, the evacuation policy for the European theater would be 60 days. Immediately after V-E Day, evacuation from the Continent to the United Kingdom was curtailed. The plan called for the evacuation out of Europe of all patients requiring over 60 days of hospitalization by the end of July 1945.¹⁴³ Staging of units for combat had halted, and planning and organizing units for redeployment to other active theaters had begun. So rapid was the closing out of activities in the United Kingdom that the occupied beds in hospitals fell from 129,289 on 90 days before V-E Day to 28,153 by the end of May and to a mere 8,664 on 30 June 1945.¹⁴⁴

The activity that now demanded by far the greatest attention from the theater chief consultant in medicine down to regional consultants in hospital centers was the formation of units for direct redeployment to other still active theaters. At least the following variables had to be considered for each individual before he could be assigned to a unit scheduled for redeployment: His adjusted service rating;¹⁴⁵ physical profile; specialty, if any; professional competence; age; and grade. These factors then had to be considered in relation to requirements of the table-of-organization position to which the individual was being assigned; that is, grade, military occupational specialty number, and index of professional competence. Above and beyond the need to weigh these specific items, there was always the desire to form compatible groups of medical officers who could work together and who, collectively, could supplement each other to provide the wide range of skills called for by the table of organization. The magnitude and complexity of the problem caused considerable confusion and many a headache. As stated earlier, many questions resolved themselves into a matter of supply and demand (p. 278).

The medical problem still outstanding at this time was the question of a mass radiographic survey for tuberculosis proposed in the earliest days of the theater. It had been deferred on numerous occasions as a result of Colonel Badger's spot surveys which indicated that there was no dangerous increase in the incidence of tuberculosis. The X-ray examination of all inductees commencing in early 1943 further mitigated the need for a mass survey. On the

¹⁴² See footnote 139, p.455

¹⁴³ Essential Technical Medical Data, Headquarters, ETOUSA, for May 1945.

¹⁴⁴ See footnote 116, p.439.

¹⁴⁵ The adjusted service rating was an arbitrary criterion for retention in service calculated on the basis of number of dependents and service in the Zone of Interior, overseas, and in combat.

other hand, certain desired radiographic surveys could not be carried out during the peak of hostilities. Now there were more data available as a result of the Air Force surveys and other limited surveys carried out in processing officer candidates and recovered prisoners of war. More recently, there was the important factor of greatly increased opportunities for contact with tuberculosis by healthy personnel in the management of large numbers of prisoners of war, displaced persons, and refugees. Although physical examinations were being conducted at assembly areas in conjunction with the physical profiling of troops to be redeployed, the possibility was remote that any significant numbers of tuberculosis cases would be uncovered by this method.

All these factors, taken collectively, indicated that a reevaluation of the problem was necessary. Fortunately, Colonel Long was in the European theater at this time. His counsel and advice were most welcome. The problem narrowed down to one salient fact: The immediate need was to detect and screen out cases of tuberculosis from units being redeployed to other theaters. Each such case transferred to another theater presented a serious liability involving future hospitalization and transportation in addition to jeopardizing the individual's life. If no screening by X-ray was conducted, it was estimated that some 200 cases of potential or active tuberculosis would be redeployed.¹⁴⁶

In consultation with Colonel Long and in coordination with Colonel Allen, the theater senior consultant in radiology, Colonel Badger formulated a plan to effect this screening with the equipment available and under expected assembly area conditions. Furthermore, in order to save time and X-ray film, it was thought desirable to limit the screening to those among whom the probability of tuberculosis was the greatest. Accordingly, the consultants decided upon screening all personnel who had been in the theater over 18 months and all Medical Department personnel regardless of length of service in the European theater. X-ray examination was to be carried out by field units of hospitals located at the assembly areas. The plan was simple and yet deemed adequate to meet the current needs. Moreover, there was a surplus of some 1,700,000 sheets of X-ray film, 14 x 17 inches, in depot stocks, although it was realized that there was an overall shortage of X-ray film worldwide. This inventory of available X-ray film excluded those in hospital stocks. The number of personnel and the criteria for redeployment indicated that there would be no more than 50,000 persons to be thus examined (fig. 156).¹⁴⁷

The plan was quickly approved within the theater headquarters, a radio message was dispatched from ETOUSA on 29 May 1945 to the War Department, and a reply was received on 31 May 1945. The plan was not favorably considered because of the worldwide shortage of X-ray film.

General Hawley, however, heeded the oft-repeated remonstrances of Colonel Badger and approved the X-ray examination of all nurses to be directly

¹⁴⁶ (1) Letter, Col. E. R. Long, to The Surgeon General, 28 May 1945, subject: Visit of Tuberculosis Consultant in European Theater of Operations, United States Army. (2) See footnote 140, p 455. (3) Essential Technical Medical Data, Headquarters, ETOUSA, for June 1945, dated August 1945.

¹⁴⁷ Ibid.

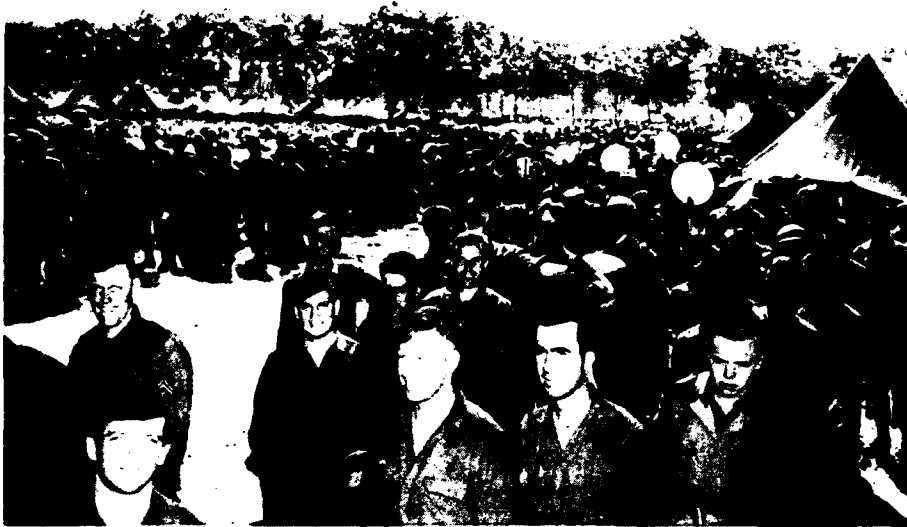


FIGURE 156. Typical assembly area conditions, Le Havre, France.

redeployed—a measure that Colonel Long had also strongly recommended, informing General Hawley that the rate for nurses as a whole in the European theater, as determined by the Medical Statistics Division, Office of the Surgeon General, was twice the average rate for the Army as a whole. Colonel Long also emphasized the fact that lesions still in the incipient stage did not cause symptoms and could be detected only by X-ray examination. Circular Letter No. 57, dated 27 June 1945, Office of the Chief Surgeon, Headquarters, ETOUSA, was published implementing General Hawley's decision and directing that the results of such surveys, with the films, be forwarded to the theater senior consultant in tuberculosis.

In the interim following the unfavorable response by the War Department, consideration was given to the employment of captured German 35-mm. equipment, which could be brought into use within from 1 to 2 months. This idea was not pursued further because it was estimated that a substantial number of the 50,000 persons considered as most in need of X-ray examination would have been redeployed by the time the project could be set into operation. Apparently, there was no alternative but to forego any plans for even a limited chest survey, except for nurses being redeployed (fig. 157). However, a War Department message, dated 28 June 1945, that was brought to Colonel Badger's attention on 2 July 1945 changed the picture completely. Upon reconsideration, the War Department now—a month later—approved the original request from the European theater, provided 14 x 17 inch film used for this purpose had an expiration date prior to 1 October 1945.

Approximately 400,000 films of this type were available in theater depots. Arrangements were made to centralize these stocks at points in proximity



FIGURE 157.— Nurses undergoing medical processing for redeployment, Camp Carlisle, Mourmelon, France, 6 July 1945.

to the Assembly Area Command and the two staging areas. Other necessary action was immediately taken to effect the survey as originally planned, but valuable time had been lost, and the opportunity for a complete survey of the most susceptible group had also vanished. Before leaving the theater, Colonel Badger completed all the necessary recommendations for a circular letter on specific measures to be followed.

Circular Letter No. 60, Office of the Chief Surgeon, U.S. Forces, European Theater, 2 August 1945, section III, subject: Chest Survey of Directly Redeployed Personnel, was promulgated after Colonel Badger's departure from the theater. It required an X-ray of the chest for all medical officers, nurses, and hospital aidmen assigned to ward duty who were scheduled for direct redeployment to another theater of operations. A similar requirement was made for all officers and enlisted men, male and female, who had been overseas for more than 1½ years and who were scheduled for direct redeployment. Such examinations were to be interpreted by the roentgenologist of the responsible hospital with proper notation of the results on the personnel records of the individuals concerned. Implementation of the plan at the local level was made a responsibility of the base section surgeon in the areas affected.

Soon after the plan was placed into full effect, the Assembly Area Command protested that the roentgenography of directly redeployed personnel was delaying the movement of some units. Accordingly, the appropriate section of Circular Letter No. 60 was rescinded by Circular Letter No. 61, Office of the Chief Surgeon, U.S. Forces, European Theater, 8 August 1945, section I,

subject: Chest Survey of Directly Redeployed Personnel; section II, subject: Chest Survey of Redeployed Nurses. Only the requirement that a chest survey be completed on all directly redeployed nurses was continued. The Japanese capitulation followed soon thereafter with the resultant curtailment of direct redeployment. This automatically ended the last of Colonel Badger's wartime tuberculosis projects in the European theater.

As Col. Osceola C. McEwen, MC, assumed the position of theater chief consultant in medicine, to help guide the transition of the U.S. Army in Europe from a wartime to occupation status, the incidence of respiratory and infectious diseases was very low. The hepatitis epidemic had well passed its peak. There was only one significant problem, diphtheria. To Colonel McEwen it appeared inevitable that with the high incidence of diphtheria among German civilians and the increasing fraternization between Americans and the German population, there would be a distinct increase in the disease among American troops during the coming winter. Furthermore, deaths from diphtheria continued to occur, and patients appeared in hospitals with obvious complications of diphtheria in whom the diagnosis had not previously been made. Colonel McEwen enlisted the help of the War Department investigators of the disease, Lt. Col. Aims C. McGuinness, MC, and Dr. Howard J. Mueller, in the preparation of a directive. The directive was published on 28 September 1945 as section I, Circular Letter No. 69, Office of the Chief Surgeon, U.S. Forces, European Theater. It was a comprehensive summary of general principles to be followed in the diagnosis, treatment, and control of diphtheria, with particular reference to conditions prevailing in the theater.

By the time V-J Day was celebrated, the wartime theater chief consultant in medicine, Colonel Middleton, and his complete staff of senior consultants had returned to the United States, their task completed.

SUMMARY IN RETROSPECT

Yale Kneeland, Jr., M.D.

The writer was consultant in medicine for 6 months in a base section in the European theater from which a very large amphibious operation was launched. Following this, his sphere of activities was enlarged to include what had originally been two additional base sections, and, at one time, the hospital bed occupancy of the area was over 129,000. He served in this capacity for 10 months.

During each period, the office of professional services consisted of two individuals - the writer and his colleague in surgery. They were under the command of, and responsible to, the base surgeon; but there was an additional responsibility, of a professional character, to the Chief Consultants in Medicine and Surgery, Office of the Chief Surgeon, Headquarters, ETOUSA. This idea of a dual allegiance is contrary to the traditional Army theory of command. Thus, their relationship to the theater chief consultants, although intimate, was in a sense unofficial. The base surgeons, to their great credit,

did not appear to object to this type of short circuit in spite of its unconventional character.

In any complex situation, the man at the top pitches the key, so to speak; his myriad subordinates try (with varying success) to sing in tune. Be it said that General Hawley, Chief Surgeon, ETOUSA, was on the side of the angels. He wanted the American soldiers to have the best possible medical care. He believed that professional services had a great deal to offer toward this objective. He respected his consultants and lent their opinions a critical, but invariably courteous, ear. He often implemented their advice against the wishes of his administrative subordinates. The prestige the consultants ultimately obtained was in large measure due to his influence. But for him, the whole of professional services might have been reduced to impotence.

Roughly, the first 6 months of the writer's service was what a bacteriologist might call the "phase of logarithmic growth." At its beginning, before the invasion, the number of hospitals in the base section was small. In the course of 6 months, new general hospitals arrived by the score. The second period was a plateau phase, where the volume of professional work was very great but the situation in regard to hospital units and personnel, fairly stable. The two periods also differed in that, during the first, the writer had free and ready access to the theater chief consultant and could submit his decisions for approval. During the second, the theater chief consultant was on a separate continent, and communication was infrequent and difficult.

To begin with, the base section consultant found himself on a medical staff that was unused to the luxury of professional services and somewhat suspicious at first of the innovation. It was necessary for him to gain the confidence of his chief and his colleagues in other sections. It was also necessary for him to orient himself in a bewildering new world. He had to visit the hospitals already set up and working, meet and appraise their medical personnel, ingratiate himself (if possible) with the commanding officers, and prepare lists of qualified individuals who might be used later on to bolster the weaker units as they arrived. Many of the "old" units were affiliated with and had been derived from teaching hospitals. These units were staffed by outstanding men.

The consultant had very little time to achieve orientation before the new units began arriving, and he experienced a sense of bewilderment which never quite left him. Here, if ever, was the moment when one needed an orderly mind, a long memory, and a flair for indices and files. Not all the good men were in the affiliated units. They turned up in field hospitals and were often tucked off in very odd corners. This particular consultant has a bad memory and a disorderly mind. Much of the time he felt as if he were looking into a kaleidoscope. He struggled and tried to overcome his deficiencies. The work had to be done and done rapidly. The new units arrived pellmell, tumbled into staging areas, and then proceeded to hospital sites that might or might not be completed. These new units were deliberately sent out from the Zone of Interior minus most of the pivotal professional men; that is, the chiefs of

services and sections. Occupants for these positions were to be provided after the unit had arrived. It was the job of the consultant to determine the needs of units and then try to supply them.

Thus, the newly arrived hospital units had to be "vetted" as soon as possible. In a 10-minute conversation, the consultant was supposed to determine each officer's educational accomplishments, experience, and character. It required considerable effrontery to do this, or to do it with any sense of infallibility. The consultant was aware of the superficiality of his judgments, but there was no time for more searching investigation.

One fell back, inevitably, upon the record of formal education, together with hospital and teaching appointments, and it was remarkable how accurate these indices were, within obvious limits. Almost invariably, the man with the best education turned in a good performance. It was true, of course, that some individuals were much better than their rather mediocre background would suggest. To some of these, injustice may have been done. But in general the modern system of internships, residencies, and board certification made a quick appraisal far easier and more accurate than it would have been in the past.

At first, an attempt was made to strengthen these new hospitals in all positions. Soon, however, it became apparent that the supply of qualified men in the theater would run out unless this strengthening were kept at a bare minimum. On the medical service, there had to be a really first-rate chief of service, one other really good younger man, a qualified neuropsychiatrist, and, if possible, someone with a working knowledge of communicable disease. (Fortunately there were a good many certified pediatricians available for this purpose.) It was desirable that one of the two internists be familiar with electrocardiographic interpretation. Also, an endeavor was made to provide someone with at least Army experience in dermatology. It was impossible to supply each hospital with a qualified dermatologist, and the deficiency was cared for by the establishment of a local consulting system in this specialty. The rest of the service could be made up of general duty officers. No attempt was made to provide an allergist or a gastroenterologist. (In an overseas theater, allergic disorders can be appraised by an internist; it is impractical to attempt any special studies. As to gastroenterologists, the average general hospital gets on better without one. The soldier with organic disease of the gut goes home; the soldier with functional dyspepsia is better off without too much study and treatment.)

Thus, the bare minimum was bare indeed, and yet it became increasingly difficult to satisfy. One did not want to reduce the affiliated units to mediocrity by too heavy withdrawals from their personnel, and yet they had to be the principal source. The consultant's dilemma was increased by the fact that many of the incoming hospitals had on their rosters professionally inadequate men of higher military rank than those whom one proposed to send in to be chiefs of services. Moreover, once the necessary shifts of personnel had been decided on, it was the duty of the consultant to coordinate the transfers.

This required convincing a given individual that he wanted to leave his unit for a more responsible post, persuading his commanding officer to let him go, and inducing the new commanding officer to accept him. A considerable amount of tact was necessary, and although it was always possible to invoke the authority of the base surgeon and order the transfers to be effected, the velvet glove was greatly preferable to the iron hand within it. Thus, coordinating took time as well as patience, and it added to the existing congestion of a badly overworked long-distance telephone system.

Once the new men had been installed in a hospital, it was necessary to visit them in order to find out how things were working out if they had, in fact, been given the jobs for which they were sent, and what problems in general confronted them. With these men, who had been assigned to a job on the consultant's recommendation, the consultant thereafter enjoyed a rather special relation. In a sense he stood in loco parentis to them, and they tended, for the most part, to consult him when difficulties arose. It was a happy arrangement.

All this activity in regard to personnel occupied the greater part of the consultant's waking hours during the first period of his service. Nevertheless, he had other occupations. He felt it incumbent on himself to brief hospital medical services on the medical problems of the invasion—or at least on what he thought the medical problems were likely to be. He discussed the management of the various infectious diseases, the function of the disposition board, and in general attempted to impart what knowledge he had gained in nearly two years overseas. Furthermore, he served as a channel by which information in the possession of the chief consultants might be directed to its destination. Lastly, he did a certain amount of actual consultation where time and distance permitted. It is possible that some of these consultations were of value, if not to the patient, at least to his physician. Always, they were of value to the consultant, and he learned from them. Occasionally, frantic calls for information came in by telephone, usually on such subjects as viper bites, wood alcohol poisoning, or botulism with which the consultant had the barest nodding acquaintance. On the whole, however, he did not regard seeing cases during his hospital visits as time ill spent. If nothing else, it gave medical officers a chance to present their choicest wares, which was always a source of pleasure.

There was routine office work, too. Disposition board proceedings were reviewed until their volume became so great that it had to be abandoned. Recommendations for promotion of medical officers were also passed on, a function that gave the consultant some opportunity, at least in a negative sense, to see that credit went where credit was due. Lastly, there were moments when his opinion was sought by other sections of the office. Altogether, during this period, he was not idle and, throughout it, received most valuable advice and cooperation from the theater chief consultant in medicine.

The last 10 months of his service as a consultant formed the second or plateau phase. The groundwork had been done, the hospitals were set up and working, and it now remained for them to give the very best care in their

power to the vast throng of sick and wounded which passed through them. For the consultant, it was a period of intense interest, although one in which he felt distressingly remote from the hospital wards. His area had been much enlarged, the hospitals were numerous, and the number of patients astronomical. He was forced to institute a system of local medical consulting based on hospital groups. (By this time, the hospitals had been divided into seven groups, each with a center headquarters.) With one exception, each of the group consultants in medicine was also chief of the medical service in a general hospital within the group. They did their consultation in addition to other duties, and very valuable service they rendered. The consultant at base headquarters worked through these men and would have been quite helpless without them.

This was a period when the need for hospital beds became pressing. Policies in regard to disposition were constantly changing, and these changes had to be implemented. At times, the administrators placed different constructions on various directives from what was intended. The consultant, through his local consultants, worked for uniformity in policy and harmony in the various agencies. One problem which can be taken as a concrete example is trench-foot. Whether the high command expected a winter campaign is irrelevant to this discussion. Certainly, the medical consultant had not, and his knowledge of cold injuries was very slight. Moreover, the available circulars on the subject left, to his mind, much to be desired, dealing, as they did, with a more severe variety of injury. Many thousands of cases were seen, but they were mild. Only 1 in 10 had any *lesion of the skin*. The specific problems that faced the ward officer were not answered in the circulars—what to do with the 90 percent mild injuries? The individual soldier lay on his back with 10 toes pointing heavenward, and, in general, they were pretty normal toes. How to treat him? How long will he be laid up? Should he be boarded home immediately—for his bed was needed badly—or kept on the chance of his being able to perform useful duty again in this theater? These were important questions for several reasons: Hospital beds were short, manpower was short (these patients were mostly combat troops), and the numbers involved were equivalent to several divisions. The ward surgeons clamored for advice. What was the medical consultant to tell them?

Unfortunately, he didn't know, but in the shortest space of time it was necessary to find out. This is not the place for a detailed discussion of trench-foot. Let it suffice to say that many willing workers helped the medical consultant. They set up trenchfoot wards where practical clinical research was carried out. Within a few weeks, it became clear that patients in whom active muscular rehabilitation was started early did better than those who were permitted to remain idle. The sooner a man was made to walk, the better. The results of sympathetic block and the like were equivocal, but the results of an earnest program of physical rehabilitation were clear. Certain criteria were established by which the immediate prognosis for return to limited duty, at least, might be guessed at. (The medical consultant did not know what the ultimate prognosis was.) In any case, some order was developed out of the

original chaos in his mind, and thereupon he could proceed—tentatively, and with no massive assurance—to disseminate a program on trenchfoot.

There was another general category of affairs that occupied the consultant. The country in which his base was located happened to be that of a very highly civilized ally and contained many learned men in many fields, who had much of great value to impart to the American medical officer. In fact, there was much of value to both sides in the mutual exchange of information. Thus, various meetings were arranged, and, in the arrangement for such programs, the consultant found himself acting as a sort of liaison officer. Moreover, he had access to all the newest medical information in the hands of his ally; he was graciously invited to attend all relevant committee meetings and, as a consequence, acquired a larger stock of knowledge to disseminate during his visits to the hospitals. Eminent medical tourists from the United States usually paid a ceremonial call at his office, and he endeavored on such occasions to pick their brains. Altogether, the office took on the character of a nerve center and, had the medical consultant himself been of greater intellectual capacity, this function would no doubt have been better performed.

The consultant frequently found himself engaged with problems in human relations, arising from the fact that most civilian doctors are not happy in military service, particularly overseas. It has already been remarked that relations between the civilians and the regulars were not easy. The typical product of the university clinic is idealistic, sensitive, and very individualistic. Often, he felt himself to be operating in an unfriendly, almost a hostile, atmosphere. One such remarked to the writer: "We all felt like June brides when we joined the Army, but I never expected the groom would turn out to be a gorilla." Strong words, no doubt, but expressive of a point of view. Often, the professional man in the hospitals felt lonely and forlorn. Frequently, he was conscious of hostility, real or imagined, on the part of the administration, usually in the person of his commanding officer.

The hospital commanders, generally, were not drawn from the top of the basket, professionally speaking. Some were regulars. Many were reservists who practiced general medicine in private life. Some were excellent. Some were not. For the perfect hospital commander, many qualities are necessary. He should have, to begin with, a firsthand acquaintance with good medicine. He should be a first-rate soldier. Add to these qualities the guile of the serpent, the softness of the dove, and a working knowledge of electricity, plumbing, landscape architecture, and international relations. Above all, he must be a housekeeper and a leader of men. To say that some hospital commanders fell short of this ideal is an understatement.

Even with good commanding officers, the professional men could become restless and unhappy. The consultant was the one individual who was in a position to apply some balm to their wounds. He stood, as has been said, in loco parentis to many of the professional men. They had direct access to him. They felt him to be on their side. At the same time, a little of the reflected

glory of headquarters hung about him, and he had, therefore, some influence with some commanding officers. The consultant's position was thus unique; he could, and possibly did, bring a little light into the gloom of some provincial hospitals. At any rate, he tried.

It was also possible for the consultant to interest himself in research, not fundamental research, but clinical investigation of the journeyman type. Under conditions of an active military campaign, definitive studies were very difficult to accomplish, but some useful information could be compiled. In this particular base, the consultant aided in the inauguration of certain studies. Specifically, these were homologous serum jaundice (in the wounded after D-day), some physiologic aspects of trenchfoot, sulfadiazine prophylaxis of common diseases of the upper respiratory tract, the local use of penicillin in infections of the mouth and throat, and antibody formation in nephritis amongst Germans.

At the end of his tour of duty, with victory in that theater won, the consultant was faced with the task of redeployment. The writer prefers to touch on this unhappy subject very lightly. It is not for him to criticize the basic theory of redeployment or to suggest that planning was insufficiently far advanced when the cease-fire sounded. The personnel problems of redeployment were uppermost in his mind, and there was little he could do about them. Many factors were involved, such as theater needs, about which the consultant knew nothing. All he knew was that his advice was sought in regard to personnel changes in the redeploying hospitals. The game had to be played according to a set of rules that he had no part in creating. There were tables of organization calling for certain specialty ratings (of which he did not approve), there was the adjusted service rating score, and there were physical profiles. All of these played a part in determining the immediate future of the individual officer. The consultant endeavored to temper justice with mercy but to little avail. He is not proud of his role during redeployment, and he gladly relinquished his post to his unfortunate successor when the moment came for him to return home.

The other hat which he wore during this whole period was labeled "senior consultant in infectious diseases." He has very little comment to make on this subject for the reason that infectious diseases never presented a major problem. There was no situation comparable to malaria in the Pacific or the unfamiliar and often exotic diseases encountered in tropical areas generally. The incidence of streptococcal, meningococcal, and pneumococcal infections was lower than in the Zone of Interior. Gastrointestinal infections were infrequent, and the incidence of childhood communicable diseases is always low in seasoned troops. The epidemic of influenza A in the late autumn of 1943 was the only major respiratory outbreak, and it presented no special problems.

So it is that as this particular consultant looks back on the war years, it is his experience as a base section consultant that overshadows all other activities.

SUMMARY IN RETROSPECT

Theodore L. Badger, M.D.

Reviewing, some 12 to 15 years later, the World War II experiences of the writer as chief of the medical service of the 5th General Hospital, senior consultant in tuberculosis of the European theater, and medical consultant to the Normandy Base Section after the invasion, there are several events that have emerged from the chaos of war experiences that are exciting and important and even glamorous.

The "Fifth General," first general hospital of the U.S. Army to arrive in Europe during World War II, landed in Northern Ireland in May of 1942. Ironically enough for a group of Harvard men, it was housed in a rather gloomy institution for delinquent boys in Balmoral, Belfast.

The hospital arrived in Ireland in the same convoy with the crack 1st Armored Division, a former cavalry division converted to armor and tanks. This proud offensive fighting unit of the U.S. Army was so riddled with homologous serum hepatitis from yellow fever vaccinations, that if it had engaged immediately in combat its effectiveness would have been seriously impaired. Up to 600 jaundiced patients were on the wards of the 5th General Hospital at one time, and a total of some 1,600 patients with hepatitis was admitted in a period of 4 months. Colonel Gordon later traced this jaundice to its association with certain specific lot numbers of contaminated yellow fever vaccine.

The 5th General Hospital staff, particularly Maj. (later Lt. Col.) Charles D. May, MC, Maj. (later Lt. Col.) Charles P. Emerson, Jr., MC, and Maj. (later Lt. Col.) Richard V. Ebert, MC, handled the medical casualties of this epidemic until later aided by the arrival of the 2d General Hospital, the Presbyterian Hospital unit from New York, with medical services under the direction of Colonel Kneeland.

The epidemic of jaundice was hardly over when the first wave of primary atypical pneumonia struck in August 1942. Two hundred and twenty carefully studied and documented cases, with a total of close to five hundred admissions, showed clearly its nonfatal course in this age group of young soldiers as well as the ineffectiveness of penicillin and sulfadiazine on the course of even the most severe military forms of the disease. It was at this time that a chest X-ray survey of the entire 5th General Hospital personnel revealed more than 50 instances of ambulatory "atypical" pneumonitis similar to that seen in those hospitalized for "typical" atypical pneumonia.

It was approximately June 1942, a month after arrival of the 5th General Hospital, when the writer met Colonels Middleton, Cutler, and Gordon. This was the beginning of a close association with all three of these men but especially with Colonel Middleton, since the writer was soon to be appointed as his senior consultant in tuberculosis for the remainder of the war "in addition to his other duties."

In December 1942, the 5th General Hospital was transferred from Belfast, Ireland, to Salisbury, Wiltshire, in southern England. The personnel and

small equipment went by plane in the course of a day, while vehicles and heavy equipment went by motor and boat.

It was during this sojourn in southern England that the mobile X-ray unit was organized. This unit, with the efficient medical aidmen of the 5th General Hospital and Colonel Smedal, the roentgenologist, proved to be a most adaptable outfit. It produced excellent chest roentgenograms with rapid efficiency in survey work and made it possible to keep track of the situation in tuberculosis with little or no dislocation of training schedules.

It was also during this long period in England, from December of 1942 to the invasion in June 1944—a period of relative inactivity while waiting for the transchannel crossing—that the basic medical program for the invasion matured. New medical units not indoctrinated in the needs of an active theater of war and variably equipped in medical talent swarmed into Britain. It was in this period that Colonels Middleton and Cutler built up the consultation services of the theater and initiated the reassignment of medical personnel from one unit to another in such a way that each general and station hospital had chiefs of services of sufficient ability and experience to assure U.S. troops the best medical and surgical care. At first, many, the writer included, objected to being “robbed” of some of their best medical talent. But it soon became apparent that this distribution of medical officers with real professional ability was not only assurance for maintaining the highest standards of medicine, but it was also an opportunity for promoting younger officers of accomplishment. Colonel Middleton in medicine and Colonel Cutler in surgery performed an extraordinary service in the equitable distribution of medical care to U. S. soldiers in the European theater.

It is to Colonel Middleton's credit that he encouraged deviations from the routine in clinical investigation, teaching, and research as long as this did not upset the military mission of building up for winning the war.

General Hawley's meetings of the professional consulting staff at the theater headquarters will always remain memorable as an exhibition of the power of persuasion when actual benefits to the health of the military command could be shown. General Hawley was a hard bargainer but gave wise and judicial council in decisions concerning the military and the medical, and he required as much of his subordinates. It was a truly superb medical service that was established in the European theater. In retrospect, it still appears that top military authorities failed to give full credit to the theater chief consultants in medicine and surgery in timely promotions and appropriate rank. For example, the theater chief consultants were frequently, if not always, of inferior rank as compared to the corresponding British consultants. The Chief Surgeon, ETOUSA, likewise, was late in receiving the rank of major general, long overdue for the service and duty he was rendering his country in the medical operations of the theater.

The special problems of the theater senior consultant in tuberculosis have been well documented in the body of this report, but two or three things may be added. The British consultants were seriously bothered that no one in the

U.S. Army was allowed to touch any British milk products because of contamination with tuberculosis. At the London County Council in 1943, it was revealed that, while only 30 percent of British milk was infested with tubercle bacillus, milk in London was felt to be 100 percent contaminated. It was collected each day by train in huge containers into which the milk supply from each station was dumped on its way to the big city. Thus, both clean and dirty milk were well mixed. Furthermore, it was believed by many eminent English physicians that this condition might be beneficial in building up individual immunity to the disease itself. Pasteurization, if used at all, was done by the flash method, which was known to be imperfect being in inexperienced hands as a result of the war's drain on skilled manpower.

Most remarkable, however, was the plight of the Soviet prisoners of war evacuated to the 46th General Hospital. These starved, emaciated men presented tuberculosis in its most acute and fulminating forms. Rarely was a problem in prevention and isolation of tuberculosis more difficult than in these men with little or no knowledge of modern vehicles of hygiene and sanitation and with whom there was a complete language barrier. Furthermore, their primitive practices of hygiene and sanitation had further degenerated under years of bestial treatment by their German captors. Protection of U.S. nurses and medical aidmen was the matter of greatest concern. To make matters more difficult, a Soviet medical delegation, sent ostensibly to help, disagreed with American methods of treating tuberculosis and did its best to assume control of all plans for treatment. It quickly became apparent to the senior consultant in tuberculosis that the sooner the Soviet command sent a train to evacuate these patients to their own "beautiful sanatoria" in the mountains near the Black Sea, the better it would be for international relations, if not for the tuberculous patients.

Most disappointing was the refusal by the War Department of the request for permission to survey by chest films all military personnel to be redeployed to the Far East theaters. When the request was finally approved, it was too late to be of much use. The ultimate, although late, acceptance of the plan by the War Department was due to the strong support given by General Hawley and Colonel Middleton.

The additional assignment of the writer as medical consultant to Normandy Base Section deserves two comments.

First was the enormous amount of cold injury or trenchfoot that was seen in the winter of 1944-45. In December 1942, the British invited representatives from the U.S. Army to a conference on cold injury in London. There, they discussed the types and varieties of clothing that wide experience had taught them were good in the prevention of cold injury. During the winter of 1944-45, the British in the European theater lost only a handful of men from trenchfoot and other cold injury as compared to U.S. losses due to cold injury. U.S. troops were ill equipped, having improper footgear and socks for use in cold weather. Whether it was improper logistics or unwillingness to accept

the experience of others is not clear, but, in retrospect, it was an error, not only of judgment but of improper clothing and shoes.

The second item to be noted concerns recovered U.S. prisoners of war. April 1945, with the end of the war in sight, brought many thousand recovered American prisoners of war to Camp Lucky Strike in the Normandy Base Section. These recovered prisoners swarmed into the camp far in excess of its medical and military resources. The early emergency care of these emaciated men was, at first, an exploration into the conservative renovation of these released prisoners who were starved from a diet deficient in proteins, vitamins, and total calories. Too enthusiastic feedings precipitated acute and serious avitaminosis. Too rapid use of intravenous plasma in those unable to eat brought acute pulmonary edema and circulatory collapse. Earlier, in the Normandy campaign, the value and ease of transnasal gastric feedings of high-protein content in those depleted by injury and infection had been learned. A high negative nitrogen balance could be readily remedied by this means, a lesson learned from the Cocoanut Grove Disaster studies in Boston.¹⁴⁸ This technique again proved useful at Camp Lucky Strike in the cautious, selective feeding of these starved and injured prisoners of war.

Colonel Long, the consultant in tuberculosis in the Office of the Surgeon General, visited the European theater on 19 April 1945. It was the writer's privilege to review with him the principal problems of interest in tuberculosis control and disposition throughout the theater. The diagnosis and treatment of the recovered Soviet prisoners of war at Besancon, France, and of the Americans at Camp Lucky Strike in Normandy constituted the major acute problems of epidemic tuberculosis. To these situations, Colonel Long contributed greatly from his long experience in tuberculosis work and with his calm wisdom in evaluating what was best for the tuberculous soldier and most expedient for the Armed Forces. He had a forceful but pleasant and friendly way of getting things done, and it was helpful to the European theater senior consultant in tuberculosis to have his backing from a higher echelon in problems vital to health but difficult of execution in the excitement of the last months of the war.

The last day of the war was memorable to the writer along with a small party of medical officers and nurses who had gone on 7 May 1945 with Colonel Long by ambulance train from Strassburg to Mannheim, Germany, to pick up a trainload of wounded soldiers.

Shortly after arriving at the Mannheim railroad station, the morning of 8 May 1945, whistles and sirens and air maneuvers announced the end of the European war. Colonel Long assembled the small group on the battered platform of the almost destroyed station of that war-ravaged city and with impressive dignity and sincerity of feeling paid deep tribute to that solemn moment when the hostilities were over at last.

¹⁴⁸ The Cocoanut Grove, a nightclub in Boston, Mass., filled by a crowd of some one thousand persons celebrating a college football victory, was swept by fire at approximately 2015 hours on Saturday, 28 November 1942. By shortly after midnight, victims of the holocaust had been evacuated to Boston City Hospital and Massachusetts General Hospital. The official count on 6 December 1942 showed 498 dead. Source: A Preliminary Report on the Cocoanut Grove Disaster, Massachusetts General Hospital, 6 Dec. 1942.

No reconstruction of the medical work in the European theater in World War II is possible without an expression of thanks to the many individuals of every rank in the Medical Department who through their loyalty and devotion contributed to the extraordinary record of medical care that was practiced throughout the theater. Among the nurses, the medical officers, and aidmen are the records of unsung heroism, whether in the combat or Communications Zone. One looks back years later with some nostalgia for the experiences in the care of the sick and wounded. Medically, the wide variety of diseases and the vast number of cases was unparalleled in civilian practice. Preventive medicine was as important as curative treatment. The somewhat harassing brushes with Army procedures were temporarily frustrating, but they never dimmed the extraordinary medical experiences of the war.

It was a privilege to have been in the consulting service of the Medical Department of the U.S. Army with a chief surgeon who combined the understanding and iron determination that was General Hawley's and under a chief medical consultant with the insight, brilliant leadership, and friendliness of Colonel Middleton. Considering the writer's 39 months in the European theater, as long as this had to be spent in military duty away from home and the practice of medicine, they could hardly have been richer in medical experience throughout the whole course of the war.

Time heals many ills as well as the personality problems that arise from the close and unnatural associations of war, perhaps because it is more pleasant to remember the brighter experiences or perhaps because distance lends enchantment and the rough places look more smooth. Perhaps, it is just the mellowing process of age that makes the best stand out in silhouette—the writer cannot say. But it is to be hoped that the lessons, other than medical, learned from World War II will make it unnecessary for the rising generation to repeat the experience of another similar or probably more devastating war sometime in the future.

CHAPTER V

Southwest Pacific Area

Henry M. Thomas, Jr., M.D.

Part I. Administrative Considerations

The medical history of the SWPA (Southwest Pacific Area) and the part played in it by the medical consultants must be viewed in the light of conditions as they existed in this area. These conditions included warfare in the tropical jungle; amphibious island hopping; stupendous engineering feats by which jungle was cleared and a whole series of isolated bases built, complete with airstrips, roads, docks, and supply dumps; and the conduct of a war 7,000 miles from the United States, with relatively little manpower and relatively little materiel of any kind.

The best of planning could not have prepared for the unique developments in Australia, New Guinea, and the Philippine Islands. No one could have foreseen that hospital personnel would have to build their own hospitals, sometimes even clearing the jungle, grading and draining the area, and installing plumbing and electricity. No one could have anticipated that shipping and air transportation would be so scarce and over such great distances that equipment which was usually considered essential, as well as key personnel, would sometimes be left behind to make room for ammunition and minimum food allowances. No one could have planned for the evacuation of casualties with even minor wounds 500 to 1,000 miles by water or air. No one could have anticipated that there would be a constant struggle to provide enough hospital beds for patients who constituted what proved to be a low sick and wounded rate. Yet all of these things came to pass, and as a result attention was focused, first of all, upon the procurement of basic essentials.

ORGANIZATION OF THE MEDICAL DEPARTMENT

The medical organization in the SWPA, which eventually grew to considerable size, began as USAFIA (U.S. Army Forces in Australia), with only a few officers. Early in 1942, Col. (later Brig. Gen.) Percy J. Carroll, MC., who was on duty in the Philippines when the war began in December 1941, collected a group of patients just before the fall of Manila and evacuated them on the small U.S.A.H.S. *Mactan* (fig. 158). When he arrived in Australia, he was made responsible, as ranking medical officer in the area, for Medical Department activities of USAFIA.

On 28 February 1942, the 4th General Hospital and a number of casual medical officers arrived and set up in Melbourne, Australia. In April, the 1st and 10th Evacuation Hospitals landed, together with several small station



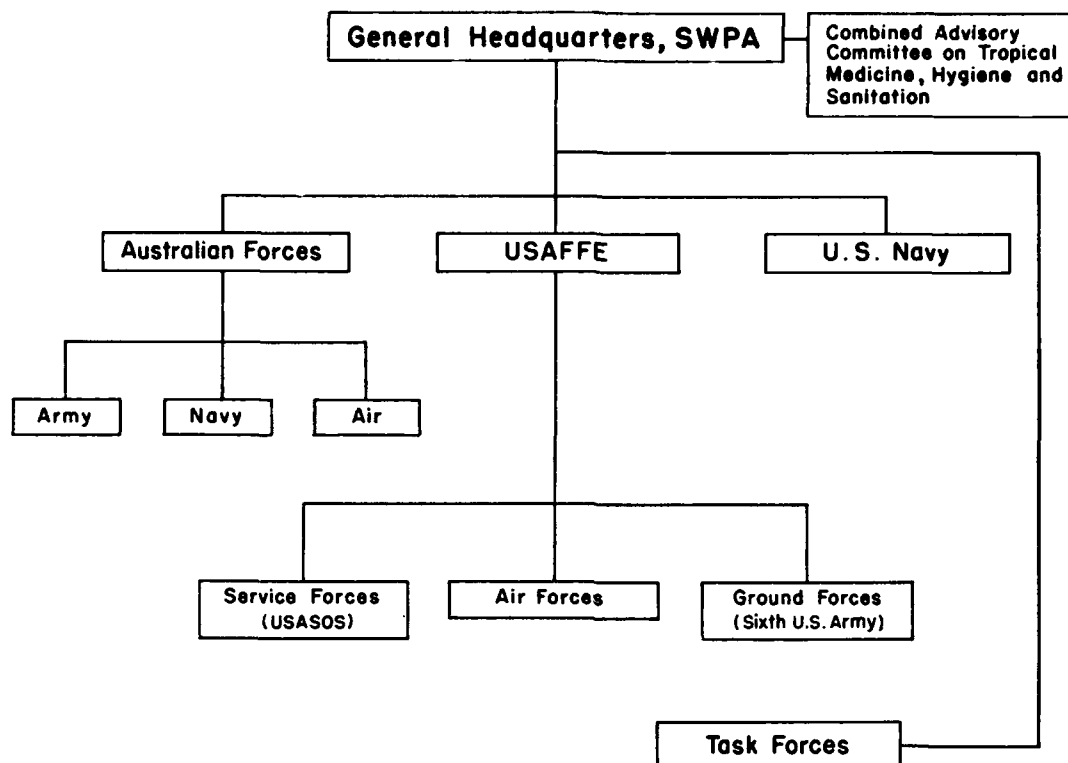
FIGURE 158.— U.S.A.H.S. *Maetan* upon her return to Manila, Philippine Islands, June 1945.

hospitals. In early June, a number of other station hospitals landed in Melbourne, on the U.S.S. *West Point*, which also brought three affiliated hospitals. These were the 1,000-bed 105th General Hospital, the 500-bed 118th General Hospital, and the 500-bed 42d General Hospital. From this time, until more than a year later, only a few casual Medical Corps officers and a few nonaffiliated station hospitals were sent to SWPA. It is small wonder that, during the early days, it seemed to many medical officers in this area that they had been left to struggle along as best as they could, since they had relatively little help in the form of either materiel or personnel.

During 1943 and 1944, certain peculiarities of the command organization in SWPA, which succeeded USAFIA on 18 April 1942, explained certain medical difficulties in this area, including the limitation of the consultants' activities.

The Commander in Chief of the Allied Forces, SWPA, Gen. Douglas MacArthur, had as his staff the personnel assigned to General Headquarters. Under General Headquarters (chart 4) were the United States and Australian Forces. On the U.S. side, directly under General Headquarters, were the U.S. Navy and USAFFE (U.S. Army Forces in the Far East). On the next level under USAFFE were the following components:

1. Ground Forces, consisting mainly of the Sixth U.S. Army. This army, with its predecessor commands, the Alamo Force (United States) and the New Guinea Force (Australian), did all the land fighting in New Guinea. The Eighth U.S. Army was organized in the course of the New Guinea campaign;

CHART 4.—*Simplified organization chart, SWPA, 1942-45*

it saw major action in the southern Philippines but played a smaller role than the Sixth U.S. Army on both Leyte and Luzon. Both the Sixth and Eighth U.S. Armies had been assigned roles in the invasion of Japan.

2. The Fifth Air Force, later the Far East Air Forces.

3. USASOS (U.S. Army, Services of Supply).

When Col. (later Brig. Gen.) George W. Rice, MC, arrived in Australia and became Surgeon on the staff at General Headquarters, SWPA, his position was entirely advisory, and he had no office personnel. There was no actual theater surgeon, although the Chief Surgeon, USASOS, ostensibly filled the position. All operational activity was centered in his office, but there was little if any collaboration between it and the Office of the Surgeon at General Headquarters, SWPA.

USAFFE, which was intermediate between these two headquarters, was a small headquarters in which the surgeon's office consisted only of one lieutenant colonel and one or two secretaries. This headquarters coordinated the activities of the various forces but did not initiate policies.

Minor changes in this organizational structure were introduced from time to time, but it was not until the end of the war, when the Surgeon's Office in Headquarters, USAFPAC (U.S. Army Forces, Pacific) was placed on the General Headquarters level and was given a sizable table of organization, that the theater surgeon's office achieved a position from which it could function effectively.

During the period of reorganization in the Pacific in the spring of 1945, General Headquarters, SWPA, and USAFFE were combined to form Allied Forces Pacific, and SWPA was changed to U.S. Army Forces, Western Pacific.

Professional Services Division

In February 1943, Col. Maurice C. Pincoffs, MC, Commanding Officer, 42d General Hospital (fig. 159), was moved to the Office of the Chief Surgeon, Headquarters, USAFFE, to serve as Chief, Professional Services. By this time, Colonel Carroll had been transferred from his position as Chief Surgeon, USASOS, to the position of Chief Surgeon, USAFFE, where he was to remain until his return to the Services of Supply Headquarters in September 1943.

Colonel Pincoffs, by both background and experience, was admirably suited for his new position. In World War I, he had served with troops in an aid station and had been awarded the Distinguished Service Cross for bravery. Between the World Wars, his position as professor of medicine at the University of Maryland Medical School, Baltimore, Md., had given him heavy teaching and administrative responsibilities. When World War II began, he organized a 1,000-bed general hospital, recruited from the staff of the University of Maryland. When it became apparent that a unit of such size would have a long wait for oversea duty, he persuaded The Surgeon General to divide it into two 500-bed hospitals and to send them overseas promptly. His training was rounded off by firsthand experience with the problems of his own hospital after it arrived in Australia, where he had some contact with casualties returning from New Guinea.

Almost overnight, Colonel Pincoffs became director of all phases of professional medical operations in the Office of the Chief Surgeon, Headquarters, USAFFE. He performed many of the duties of consultant in medicine until the arrival of Col. Henry M. Thomas, Jr., MC (fig. 159), in October 1943. Colonel Pincoffs represented the Chief Surgeon on all professional matters, particularly those that required cooperation with other headquarters or other branches of USASOS. With Col. Howard F. Smith, U.S. Public Health Service, he also represented the Chief Surgeon on the Combined Advisory Committee on Tropical Medicine, Hygiene, and Sanitation. This committee, which was attached to General Headquarters, SWPA, and reported directly to General MacArthur (chart 4), was composed of representatives of the armies, navies, and air forces of the United States and Australian commands. Its chairman was Brigadier N. Hamilton Fairley of the Royal Australian Army Medical Corps, an international authority on tropical disease.

Colonel Pincoffs edited technical bulletins. He reviewed all reports, including those from various research projects. He handled arrangements for the United States of America Typhus Commission (p. 526). He directed the policies and activities of the Preventive Medicine Section, which consisted of a single health officer, with almost no army experience, a situation which could not be corrected because of lack of contact with the Office of the Surgeon General. Colonel Pincoffs also advised with the surgical and neuropsychiatric

Col. Maurice C. Pincoffs,
MC, Chief, Professional Services,
and Chief Consultant in
Medicine, Office of the Chief
Surgeon, USAFEE, SWPA.



Col. Henry M. Thomas, Jr.,
MC, Consultant in Medicine,
Office of the Surgeon, Fourth
Service Command, and Senior
Consultant in Medicine, Of-
fice of the Chief Surgeon,
USASOS, SWPA.

FIGURE 159. Consultants in medicine, Southwest Pacific.

consultants; reports from the Dental, Veterinary, and Nursing Sections passed over his desk.

Colonel Pincoffs continued to perform these responsible and onerous duties in Headquarters, USAFFE, until June 1945 except for the period between 1 October 1943 and 21 January 1944, when he served in the same capacity in Headquarters, USASOS.

In the early days, when SWPA was in the formative stage, it was both necessary and practical for this widespread diversity of duties to be handled by one person. As time passed and complex problems began to develop in rapid succession, each duty grew larger, and bottlenecks developed and persisted. There was no one to rearrange duties and delegate authority, for the Chief Surgeon, the Deputy Surgeon, and the Executive Officer were all fully occupied with necessary planning and operations in their office.

In January 1944, when Brig. Gen. (later Maj. Gen.) Guy B. Denit (fig. 160) was appointed Chief Surgeon, USASOS, and also designated Chief Surgeon, USAFFE, it had seemed that a step was being taken toward coordination of the various units of the theater medical service. Only in the Office of the Chief Surgeon, Headquarters, USASOS, however, was there adequate personnel for operational functions, and the general status of the medical service therefore remained substantially unchanged.

In January 1944, when Colonel Pincoffs returned to USAFFE, the various consultants were instructed to report directly to the Chief Surgeon, USASOS (fig. 161). This change in organization, which was designed to give the consultants greater scope in their activities, did not materially alter their duty functioning, but it added so greatly to the Chief Surgeon's routine duties that the consultants, with the rest of the office staff, were placed under the direction of the Deputy Surgeon. His duties left him no time for professional matters, and the situation was as unsatisfactory as it had been before General Denit's appointment.

Growth of the Consultant System

From time to time in the early days of the war in the Pacific, Colonel Carroll transferred officers from hospital units to duty in his office at USASOS or used them to form base surgeon's staffs when bases were formed throughout Australia and later in New Guinea.

In June 1942, Lt. Col. (later Col.) William B. Parsons, MC, and Lt. Col. (later Col.) Samuel A. Challman, MC, were sent from the United States and assigned to USASOS, Colonel Parsons as consultant in surgery and Colonel Challman as consultant in neuropsychiatry.

A month later the young, inexperienced captain in the Medical Reserve Corps who had been sent from Washington, D.C., to act as consultant in medicine, USASOS, was replaced by Lt. Col. (later Col.) Joseph M. Hayman, Jr., MC, Chief, Medical Service, 4th General Hospital, who acted in this position until 11 October 1943. On that date, Colonel Thomas, formerly consultant in medicine, Fourth Service Command, reported to General Headquarters,



FIGURE 160. Brig. Gen. Guy B. Denit.

SWPA, and was assigned to the Office of the Chief Surgeon, Headquarters, USASOS, as consultant in medicine.

When Colonel Thomas assumed his duties as consultant in medicine, SWPA, in October 1943, he had been greatly assisted by the 2 days spent with Colonel Hayman, who had been serving as consultant in medicine and who had recently returned from a useful tour of instruction in hospitals in Australia and New Guinea. His explanation of the overall situation in the area proved extremely helpful.

When, therefore, Colonel Thomas requested and was granted a replacement during the reorganization of the area in the spring of 1945, rather than embark on a new and possibly lengthy undertaking, he performed the same service for Col. Roy H. Turner, MC, the newly appointed consultant in medicine. Colonel Thomas remained for 5 weeks in the Chief Surgeon's (General Denit's) Office while Colonel Turner visited several bases and became acquainted with office procedures and personnel. During this period, the Chief Surgeon, the Sixth U.S. Army surgeon, and several consultants attended a conference in Washington on medical problems in the Pacific.

Colonel Thomas arrived in San Francisco, Calif., on 21 September 1945.

Assistant consultants. When the consultant service finally began to function with some degree of adequacy, it was immediately apparent that one of the most useful functions performed by consultants was the visits they were making to hospitals operating in remote bases in New Guinea. These visits served for both instruction and morale building. When Colonel Thomas



FIGURE 161. Consultants at medical section, Headquarters, USASOS. Extreme left, Col. Maurice C. Pincoffs, MC. Facing camera, Maj. John Ambler, MC, to left of post, Lt. Col. Eugene Eppinger, MC, to right of post.

returned from his first visit to forward areas in New Guinea, he recommended an increase in consultation service, by the appointment of two clinicians of superior ability to serve as assistant medical consultants on temporary duty, who would spend most of their time visiting medical installations in forward areas. This plan was approved and was also adopted by the surgical consultant service. It proved increasingly useful as the fighting moved farther along in New Guinea and more and more bases were turned over to USASOS by various task forces.

On 4 January 1944, Colonel Hayman and Lt. Col. (later Col.) Eugene C. Eppinger, MC, were flown to New Guinea, each to serve as medical consultant for two bases. Late in 1944, these officers were replaced by Maj. (later Lt. Col.) Myles P. Baker, MC, from the 105th General Hospital, and Maj. (later Lt. Col.) Frederick T. Billings, Jr., MC, (fig. 194, p. 548) from the 118th General Hospital. Major Baker was later Chief, Medical Service, 54th General Hospital, and Major Billings, Chief, Medical Section, 118th General Hospital. Their work as assistant medical consultants was of great value to them in their subsequent assignments as well as to the units which they visited.

The bases in New Guinea were under a command known as Intermediate Section. The Surgeon, Col. Raymond O. Dart, MC, a Regular Army pathologist, who had been in command of the 105th General Hospital, was extremely helpful to all professional consultants, and his cooperation greatly aided them in performing their duties.

Consultant system, Sixth and Eighth U.S. Armies.—In the SWPA, because of the command organization (p. 475), the Chief Surgeon, USASOS, was on the level of the Surgeons of the Sixth U.S. Army and the Air Forces. Each new task force was largely staffed by the Sixth U.S. Army, accompanied by Navy groups and the Fifth Air Force. Each task force functioned directly under General Headquarters, SWPA, without control from USAFFE or USASOS.

This arrangement made for innumerable difficulties and effectively prevented the consultants from having any contact with the army surgeons. All reports, requisitions, and requests from the Surgeon, Sixth U.S. Army, went directly to General Headquarters. There was no routine communication between what was supposed to be the theater surgeon's office (Chief Surgeon, USASOS) and the surgeon of the combat troops (Surgeon, Sixth U.S. Army). The theater consultants' activities were therefore strictly confined to units under USASOS control unless specific requests for assistance were received from the Surgeon, Sixth U.S. Army.

On the surface, it would seem that these difficulties could readily have been resolved if the appropriate officer from the Office of the Chief Surgeon, Headquarters, USASOS, had visited forward headquarters (Sixth U.S. Army) with instructions to cooperate in every way possible with respect to the medical needs of the combat troops. If General Denit's trip to New Guinea had not been cut short by a severe attack of dengue, which required his return to Australia for convalescence, it is quite possible that the situation, which had developed before he was assigned to SWPA, would have been altered.

By July 1943, when the need for a medical consultant in the Sixth U.S. Army had become apparent, Col. (later Brig. Gen.) William A. Hagins, MC, assigned to this position Lt. Col. (later Col.) Garfield G. Duncan, MC, Chief of Medicine, 52d Evacuation Hospital, an affiliated unit then assigned to the Sixth U.S. Army. Colonel Duncan was later decorated with the Legion of Merit by the Sixth U.S. Army commander, particularly for his field demonstration of the efficacy of Atabrine dihydrochloride (quinacrine hydrochloride) in suppressing malaria and for his educational and supervisory activities concerning its use in combat troops.

When the Eighth U.S. Army was forming, while it was still a skeleton organization, Lt. Col. (later Col.) Worth B. Daniels, MC, was sent from the Zone of Interior to serve as medical consultant to the Army Surgeon. By virtue of his background in internal medicine and his accomplishments as Chief, Medical Service, Station Hospital, Fort Bragg, N.C., he was unusually well fitted professionally for consultant duties in a combat army. The closest and most profitable kind of cooperation grew up between him and Colonel Thomas as the result of numerous conferences and long discussions.

In January 1945, when vacancies for medical consultants existed in both the Sixth and the Eighth U.S. Army, Col. Bruce P. Webster, MC, and Colonel Eppinger were requested for this purpose. Colonel Eppinger at that time was assigned to the Office of the Chief Surgeon, Headquarters, USASOS, as assistant

to the Chief, Professional Service, and both he and Colonel Webster were declared indispensable by the Chief Surgeon. After a lapse of several months, two excellent young lieutenant colonels were assigned from the Zone of Interior on the recommendation of Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General.

FUNCTIONS OF THE MEDICAL CONSULTANT

Before discussing the functions of consultants in the SWPA, it might be well to mention briefly the plight in which the Medical Corps found itself in the early days of the war, when it was obliged to care for the health, both on and off the battlefield, of some 10 million citizens who had been suddenly called away from their civilian pursuits and made into soldiers. With very little help from line officers, who had all that they could do in their own fields, the Medical Corps of the Regular Army found itself directing the military training and functioning of the civilian physicians who had entered the service and who were to provide most of the specialized care which soldiers required.

These civilian physicians, by virtue of their professional status, had been accustomed to giving orders, not taking them. They did not take kindly to discipline. They disliked redtape. They were usually oblivious, because of their training, to everything but the welfare of the sick and wounded. Many of them were slow to learn that wars are not won by sick and wounded. The business of keeping fighting soldiers in condition to fight was a new point of view for them. They comprehended only vaguely the morale-building value of preventive and supportive medical service. They had suddenly been transported into an exacting new environment, in which they were required to perform uniformly as well as efficiently. Left to themselves, many of them would never have learned how to find the sick and wounded, how to transport and house and feed them, and what to do with them after their medical treatment had been completed. In short, they had no idea how much they did not know or what they had to learn about military organization.

For their part, the Regular Army medical officers were faced with serious problems. It was these officers who, often without firsthand experience, had to command hospitals, a position which even the best of the affiliated units often had difficulty in filling satisfactorily from their own personnel.

Under the circumstances, misunderstandings were inevitable, and unlimited patience, tact, and effort were needed to resolve them. Consultants could have served profitably on the staffs of command surgeons, filling the important professional gap between the surgeon of the command and newly inducted medical officers. It is unfortunate that all consultants were not appointed earlier and that their functions were not more clearly understood.

The consultants themselves, however, were in a rather difficult position. They had not had any previous experience in their duties, and they had no experience in overall military organization and operation. There was no position for them in the table of organization, and the Chief Surgeon, USASOS,

acting as theater surgeon, was allowed only about a third of the officer personnel he needed in his office. He therefore gave the consultants assigned to it many and various duties. They were given various routine duties, including checking disposition board proceedings for physical disability examinations for candidates. The surgical consultant was given the task of organizing the writing of the medical history, a task which was later taken over by a lieutenant in the Medical Administrative Corps sent from Washington. Until after the visit in May 1943 of Brig. Gen. Charles C. Hillman, Chief, Professional Services, Office of the Surgeon General, the consultants could not leave the office to visit hospitals.

There was constant pressure from higher headquarters to limit the table of organization. To comply with this pressure, the consultants were placed on the rosters of various hospital units in which position vacancies existed and were brought into the Office of the Chief Surgeon, Headquarters, USASOS, on temporary duty. This was not a desirable arrangement, for a number of reasons. It eliminated chances for promotion of medical officers in the hospitals to which the consultants were assigned. Because they were not on the headquarters table of organization, the consultants were not adequately provided with office space or secretarial service. As a result, each consultant functioned individually. When, after General Hillman's visit, the consultant was given some freedom of movement, he spent part of his time traveling around the area to obtain information and give instruction and part at headquarters, where, almost singlehandedly, he prepared reports and recommendations and attempted to accomplish "completed staff action." Often on his return he found on his desk for such action the very reports which he had himself made during his tour.

In January 1945, in an informal report, Colonel Thomas outlined his impressions of the function of a consultant in medicine, based upon his own 15-month experience in this position, as follows:

Improvement in the care of the patient and the conduct of the hospital can be attained by the consultant's precept and example, by his supervision, by his explanation of the principles laid down in the technical memorandums circulated by headquarters, by discussions of the medical literature, by the awakening of interest in the study and treatment of disease, and by the proper handling of the soldier patient so as to improve his morale and prevent the condition known as hospitalitis.

The chance to discuss their observations and ideas with more experienced medical men is welcomed with real enthusiasm by the few well-trained clinicians in small hospitals. For less well trained medical officers, the opportunity to widen their knowledge is of the utmost importance in their present and future careers in the practice of medicine.

The work of the whole service in a hospital is raised to the level of efficiency of the individual chief of service when he realized that an important part of his duties is careful bedside supervision, in order to provide for good case histories, thorough physical examinations, appropriate laboratory tests, suitable therapeutic measures, and, finally, prompt and correct disposition of patients. Worthwhile clinical experience then can be obtained by all members of the service.

Colonel Thomas commented, at the end of this report, that, at present, most chiefs of medical services were well-trained men, whose only lacks were

experience in teaching and in running a service. These things they could learn. In the few instances in which chiefs of service had insufficient professional training, adequate replacements could be provided.

Redistribution of medical officer personnel.— On the whole, well-trained professional personnel were scarce in SWPA and were chiefly concentrated in the group of general hospitals affiliated with medical schools (Harvard, Johns Hopkins, University of Maryland, College of Medical Evangelists). Each of these hospitals had among its personnel highly qualified surgeons and internists who were fully competent to perform as chiefs of services but who were assigned as chiefs of sections or, in some instances, as ward officers. In addition, occasional station and evacuation hospitals had among their personnel several officers competent to serve as chiefs of services. In contrast to this plethora of skilled and well-trained medical officers, many station and evacuation hospitals were completely lacking in competent surgeons and physicians.

In September and October 1944, Colonel Eppinger, who was then serving as assistant consultant in medicine, Headquarters, was directed by the Chief Surgeon, USASOS, in collaboration with other consultants, to make a survey of existing assignments and to make recommendations for reassignment of medical officers throughout the theater. The objective of the survey and redistribution of personnel was to strengthen the weak units without weakening the strong.

In November 1944, on orders from the Chief Surgeon, USASOS, more than 100 medical officers were transferred to new assignments. The reactions to these transfers were varied. Many officers were given opportunities to assume positions commensurate with their abilities and were put in line for promotions. Others were loath to be separated from their units. Still others, unfortunately, became displaced persons, losing both their positions and their seniority.

By 1945, the affiliated units had been so reduced in key personnel that some of them had difficulty in functioning efficiently. On the other hand, the excellent performance of the reconstituted units during the remaining fighting in New Guinea and the campaigns in the Philippines justified the drastic reshuffling of officers.

Upon the completion of this survey, Colonel Eppinger visited all the New Guinea bases, advising with the disposition boards of the hospitals and responding to requests to function as medical consultant.

Summary and Analysis

In retrospect, the following points impress one as explaining many of the professional difficulties encountered by consultants in the SWPA in the performance of their duties:

1. The type of warfare necessary in the jungle and the long water or air travel between bases introduced unusual problems of organization, construction, hospitalization, evacuation, and supply.

2. General Headquarters, SWPA, did not concern itself to any great extent with medical problems.

3. There was no authoritative surgeon at the theater level, and command organization led to indirect and conflicting relations between the medical branches of USASOS and the Sixth and Eighth U.S. Armies and the Fifth and Thirteenth Air Forces.

4. In the Office of the Chief Surgeon, Headquarters, USASOS, most professional problems were directed by a single officer, a state of affairs which persisted even after the theater had grown large.

5. Medical officers in the area during its formative days were inexperienced in administrative duties.

6. The functions of consultants as a group were poorly understood by all concerned. Regular Army medical officers were inclined to think of them chiefly as inspectors, and they were usually treated as such by the commanding officers of the units that were visited. The professional staff were more inclined to consider them as professional consultants, as in civilian life, and to accept them as instructors and advisers. Instruction and advice were frequently needed by the chiefs of service in respect to supervision of the professional activities of their officers, personnel problems, and supply problems.

An additional difficulty was that the consultants in the various specialties arrived in the SWPA at different times, with different concepts of their own and each other's functions. The administrative difficulties under which they labored and the wide areas that separated them during most of their duties delayed their learning to function cooperatively, and there was no one to give them the assistance they needed. Owing to lack of definition, their efforts at cooperation with various sections of the Chief Surgeon's Office were often ineffectual.

7. The SWPA, not without reason, came to believe that medical care had to be provided in an area in which neither materiel nor personnel would be adequate until Germany had been defeated. General Morgan visited the theater in the very early days of the war, but he had so much ground to cover that he was unable to clarify many of the problems which then existed. A second visit from him at a later date would have been very useful. When the Consultant in Surgery, Office of the Surgeon General, visited the SWPA in 1944, the circumstances of his visit prevented his spending much time on these matters. There were other occasional visitors, but they did not stay long enough to find out why the policies and procedures they criticized were being employed, and their visits were too short to be really helpful.

In spite of these difficulties and serious handicaps, however, the Medical Department in SWPA performed courageously and to good effect.

ACTIVITIES OF THE MEDICAL CONSULTANT

Colonel Thomas' first week at Headquarters, USASOS, after his appointment in October 1943, left him with a somewhat confused picture of the war in

SWPA. Brisbane, a pleasant, middle-sized Australian city, had a climate not unlike Baltimore, Md. Most of the ranking officers, in addition to General MacArthur, were billeted at the single modern hotel, Lennon's. The two general hospitals nearby had a few interesting cases, but their personnel were rather bored by nothing but routine duties, far from the combat zone, and were inclined to be critical of evacuation policies, especially those for neuropsychiatric patients.

All headquarters were then located in Brisbane except those of the Sixth U.S. Army, which had moved to Goodenough Island. One was depressed by the feeling of isolation from Washington and the Army in the rest of the world, and by the indirect relationship between the Office of the Chief Surgeon, Headquarters, USASOS, and the medical services of the fighting forces. It was stated that since General Hillman's visit to the area in May 1943, the consultants had been allowed more freedom of movement, but it was still evident that their functions and possible usefulness were not well understood.

First tour of New Guinea hospitals.—When Colonel Thomas was about to set out on his first tour of New Guinea hospitals, the problem of transportation was simplified by the arrival of the team from the United States of America Typhus Commission, which had been sent out to study tsutsugamushi fever (scrub typhus) and was about to be flown to its station at Dobodura, New Guinea. After a long wait at the airstrip near Brisbane, in the early morning darkness, the C-47 took off with its passengers in strapless bucket seats. At Townsville, Australia, 700 miles north, the plane stopped briefly for fuel, and then flew straight across the Coral Sea to land, after another 700 miles, at Port Moresby, New Guinea. That night, the group was billeted in the dormitory of a small officers club, and on the following morning, the scrub typhus team, headed by Dr. Francis G. Blake and Dr. Kenneth F. Maxcy, took off to fly through the gap of the Owen Stanley Range to Dobodura.

By this time, Port Moresby and Milne Bay had become staging areas and transportation terminals. The war had moved on past Buna and Dobodura up toward the Markham Valley and around the coast toward Finschhafen. It was at about this time that Bases D, A, and B (Port Moresby, Milne Bay, and Oro Bay) were designated as Intermediate Section, USASOS, and provided with a small headquarters.

The surgical consultant, Colonel Parsons, who was just finishing a trip in New Guinea, went out of his way to assist the new medical consultant on his first tour. He accompanied him to Milne Bay and introduced him to the Surgeon, Base A, and to several of the local hospital commanders. This was cooperation of a positive nature, which was most helpful at an important time of adjustment to a new and strange environment.

As Colonel Thomas visited the station hospitals in New Guinea (fig. 162) and talked to the various medical officers in them, he found that disease problems fell into a pattern quite different from the pattern which had been anticipated. When a Japanese force of some 11,000 troops had crossed the Owen Stanley Range, over the Kokoda Trail, in August and September 1942, and had come



FIGURE 162. 117th Station Hospital, Port Moresby, New Guinea, October 1943.

within 32 miles of Port Moresby, it was stopped at Ioribaiwa by three adverse forces, (1) valiant Australian troops assisted by U.S. forces, (2) semistarvation, and (3) disease. The two diseases which were known to have wrought havoc in Japanese troops, and which also affected U.S. troops in the area, were malaria and dysentery.¹

Work at headquarters.— On his return to Brisbane, Colonel Thomas prepared memorandums on a number of subjects, including common mistakes in the suppression and treatment of malaria; the diagnosis and treatment of scrub typhus; the problems of psychoneurosis as they concerned medical and line officers; and fungus infections of the feet. A reply was also prepared to a request from the Office of the Surgeon General for information on filariasis in the Southwest Pacific. All of this material was submitted to the Chief, Professional Services, USASOS.

Colonel Thomas, during his stay at headquarters in Brisbane, visited the 14th General Hospital in Melbourne, the 118th General Hospital in Sydney, Australia, the 105th General Hospital in Gatton, Australia, and two station hospitals. By special arrangement with Colonel Duncan, he also visited the Sixth U.S. Army Reconditioning Center at Rockhampton, Australia (fig. 163).

¹As a matter of convenience, descriptions of all diseases observed by Colonel Thomas in his tours of hospitals are concentrated in part II of this chapter.



FIGURE 164. 125th Station Hospital, one of medical facilities at Rockhampton, Australia, May 1944.

On 4 January 1944, with two temporary duty consultants, he left Brisbane for a second round of visits to New Guinea hospitals.

Second tour of New Guinea hospitals. In January 1944, the base at Milne Bay (Base A) was visited, and local medical installations were inspected in the company of Colonel Eppinger. Short visits were paid to the 227th Station Hospital, the 268th Station Hospital, the 124th Station Hospital (fig. 164), and the 125th Station Hospital.

Three recent sudden outbreaks of diarrhea in three separate units, each numbering from 50 to 75 cases, were under investigation by the base area surgeon. *Shigella flexneri* had been recovered in the first outbreak, and bacteriologic studies of the other outbreaks were in progress. No break in sanitary techniques had been discovered, and no water or food could be incriminated. The medical consultant was asked to suggest further studies which might be indicated.

Conferences were held with the Surgeon, Base A, who expressed his appreciation for the help being given by the consultants to the various hospitals, as well as to his office through the information gained on their previous visits. He had already realized the weakness in the professional training of some of the hospital units.

Tour in Leyte. After Leyte was turned over to the Eighth U.S. Army and to ASCOM (Army Service Command), Colonel Thomas was relieved of tem-



FIGURE 161. 124th Station Hospital, Milne Bay, New Guinea, May 1944.

porary duty with the Sixth U.S. Army and spent the first 3½ months of 1945 in Base K (Tacloban, Leyte) (fig. 165), working with general and station hospitals and with the Base K surgeon on professional problems. He had been greatly pleased when space was provided for him to accompany the staff of the Surgeon, Sixth U.S. Army, and the attack force sailing from Leyte Gulf to Luzon on 6 January 1945, but orders arrived the day before embarkation transferring him back to USASOS and ordering him for the present to remain at Leyte. This, in fact, was proper, since 90 percent of a medical consultant's activities concern the care of the sick who require hospitalization and are of no immediate concern to a combat army. The other 10 percent concern observations which might be valuable in some future military operation or might be used for the information of the theater surgeon's office in planning to take over a base when the army turns it over. The surgical consultant takes an active part in the early care of the wounded. The neuropsychiatric consultant is much more effective after the smoke of battle has cleared away.

Many problems were studied. Trained laboratory officers and technicians were badly needed by all hospitals. Several Drinker respirators were installed at the 126th General Hospital, and active cases of poliomyelitis were treated there. Assistance was given to Col. Alvin J. Tillman, MC, Chief, Medical Service, of this hospital in preparing a condensed outline of treatment of infestation with varying combinations of intestinal parasites. Copies of this



FIGURE 165. Office of the Surgeon, Base K, Dulag, Leyte, Philippine Islands, December 1944.

outline were distributed to the hospitals in Base K and, later, to hospitals in Bases X (Manila) and M (San Fabian, Luzon).

Amebiasis was observed in all hospitals, and particularly fruitful work on this condition was done at the 133d, 44th, and 118th General Hospitals (p. 539). Infectious hepatitis was frequent in all hospitals, and the patients were, of necessity, transferred during the active stage of the disease to the 2d Convalescent Hospital, Leyte, or evacuated to rear bases. There were a few relapses, but most of the patients did surprisingly well under the rather rapid treatment that the exigencies of war imposed.

Tour in Manila. When the Chief Surgeon's Office moved to Luzon, on 12 April 1945, the consultants followed. Manila was a pile of dust and debris. The destruction of large parts of the city, the U.S. bombardment, and Japanese demolition in their retreat completely wiped out the distribution of water and electricity and, of course, destroyed all sanitation. The victors found themselves in possession of a public health situation best compared to a volcano filled with dynamite. The danger of ravaging outbreaks of cholera and all manner of dysenteric diseases was enormous, and local public health agencies had been either destroyed or demoralized.

This problem was the responsibility of Colonel Pincoffs, who had been assigned as director of public health in Luzon, and his successful management of this unplanned-for emergency is a story of great importance. He brought with him the consultant in dermatology, Maj. (later Lt. Col.) John V. Ambler,

MC, who also functioned as venereal disease control officer after the incumbent officer, Lt. Col. (later Col.) Ivy A. Pelzman, had been evacuated for dermatitis.

Due credit must be given to the Army Air Forces for cooperation in repeated dusting of the entire city and its environs with DDT (fig. 166), which kept the fly population well controlled and prevented spread of disease. In the disorganized filth of Manila, however, an unprecedented increase in venereal disease was inevitable. Soon several station hospitals were filled with patients requiring specialized treatment. Dr. Joseph E. Moore was sent out to observe the situation and offer advice. The whole problem rightfully belonged to the Preventive Medicine Section, but this office was inadequately staffed, with a single officer of little experience, and liaison and communication with the Office of the Surgeon General were poor.

Hospitals were established in Manila in buildings which had been left standing, one of them the grandstand of the Manila Jockey Club (fig. 167). Except for two field hospitals, all the units sent to Manila were relatively new in the theater; some had arrived directly from the United States.

Colonel Eppinger, with 20 officers recruited from 10 different hospitals and about 35 nurses, had arrived in Manila to care for the internees of Santo Tomas shortly after their liberation (fig. 168). When this mission was completed, he returned to the Chief Surgeon's Office and soon thereafter departed for the Zone of Interior, where he was assigned to duty in the Medical Consultants Division, Office of the Surgeon General. Colonel Thomas requested that an assistant consultant be assigned to serve as executive officer of the consultant section at Headquarters, USASOS, in Manila. The request was approved, and the difficult position was ably filled by Maj. (later Lt. Col.) Wilson M. Wing, MC.

Routine duties kept Colonel Thomas in his office at Headquarters, USASOS, a large part of the time. One of these duties was a review of the MOS (Military Occupational Specialty) classification of every medical service officer, an arduous task, since it had to be performed all at one time. A comprehensive chart of the officer personnel of the medical services of all the hospitals was completed and was taken to the Office of the Surgeon General by the Chief Surgeon in July 1944. It showed graphically the extreme weakness in the area of B-3139 officers, who were the better trained internists.

Hospitals in New Guinea were closing and moving to the Philippine Islands and the new general hospitals arriving in the area were poorly staffed and inexperienced. Colonel Baker, Chief of Medical Service, 54th General Hospital, was again placed on temporary duty as assistant medical consultant. He performed an essential service visiting the hospitals in and around Manila and also made one visit to northern Luzon. Teams were established to brief the newly arrived general hospitals on administrative and professional matters.

A preliminary plan for the creation of an Army school of tropical medicine in Manila had been submitted to the Chief Surgeon, USASOS, by the medical consultant, who had been assisted in formulating the detailed plans by Lt. Col. Charles A. Armbrust, MC. The purpose of the school was to emphasize the



FIGURE 166. DDT dusting of Manila by C-47 aircraft, April 1945.

teaching of the clinical and laboratory aspects of tropical medicine, as well as the preventive aspects, and it was hoped that it might become a permanent fixture in the peacetime Army Medical Department.

Plans for the school were approved, and the opening date was set for 12 December 1945, but V-J Day came before the opening day, and the plans were dropped.

Billets. The consultants were itinerants. They left their footlockers at Lennon's Hotel, USASOS Headquarters in Brisbane, and traveled only with two musette bags. When they were found to be away a large part of the time, they soon lost these accommodations, particularly since on paper they were assigned to some distant general hospital and were at Headquarters, USASOS, only on so-called temporary duty. In the field, they had a variety of accommodations, sometimes in the commanding officer's tent, sometimes with other medical officers (fig. 169). Mosquitoes made it necessary to sleep inside of nets. The large field rats called bandicoots often prowled through the tents at night. Mud or dust was the rule.

HOSPITALS AND MEDICAL SERVICE

In general, hospitals in the theater retained their authorized bed capacity, expanding and contracting according to needs of the moment. In a few instances, in the fall of 1944, evacuation and large station hospitals were expanded to general hospitals; the changes were made before the consultants



FIGURE 467. 49th General Hospital at the Jockey Club, Manila, Philippine Islands, April 1945.

and officers in the Professional Service Division, Office of the Chief Surgeon, Headquarters, USASOS, were informed of them.

New Guinea. After visiting the 54th General Hospital, Colonel Thomas submitted an informal report to the Chief Surgeon, USASOS, on 25 November 1944, containing the following (summarized) information:

The 54th General Hospital now has a census of 2,100 patients—700 medical, 170 neuropsychiatric, and 1,230 surgical. In all probability, this census will increase to between 2,500 and 3,000.

The table of organization provides for 44 medical officers for the professional services. At present, 4 officers are assigned to the neuropsychiatric service; 1 or 2 more will be necessary. This leaves 40 officers for the medical and surgical services—23 surgical and 17 medical. The medical service would then consist of 21 to 30 wards, with 1 chief of service, 1 assistant chief of service and 15 ward officers. Such a service could function by using abbreviated clinical histories, a minimum of laboratory tests, rapid group boarding methods, and supervision of only the seriously ill patients by the chief, with weekly or fortnightly circulation through the wards. When all personnel are well trained and capable of that most difficult clinical procedure consisting of a rapid short clinical history and physical examination and an intelligent reduction of laboratory tests to the bare essentials, then a service such as this can provide good medical care.



FIGURE 168. Santo Tomas University, Manila, Philippine Islands, February 1945.

The surgical service was visited by the surgical consultant, who would render a separate report. Many of the more than 1,200 patients on this service were severely wounded or needed surgery. The chief of service was the only highly trained surgeon on the service, and only a few of the medical officers assigned to it were capable of serving as satisfactory assistants to him. A partial solution to this difficulty had been found in the utilization of the services of officers staging in the base. At one hospital, officers from three ship platoons were lending valuable assistance. At another, officers from a single ship platoon were reporting irregularly, and their services were not satisfactory. At this hospital, officers reporting for duty at two new evacuation hospitals which were staging were also helping out.

In the past, the busiest period experienced by hospitals was immediately after they were opened. The jump from a census of 0 to one of 2,000 patients in the course of a few weeks represented a huge volume of work. Later, as the war moves forward and the base stabilizes, the hospital remains busy but returns to a more normal existence.

It is of the utmost importance that hospital staffs be augmented in the early days of operation, when the casualty load is excessive, and that the augmentation be accomplished by design rather than by chance. If units are not available in the base from which temporary duty personnel can be drawn, then the necessary officers can be temporarily attached from units in other bases in which the load is lighter or in which units are staging.

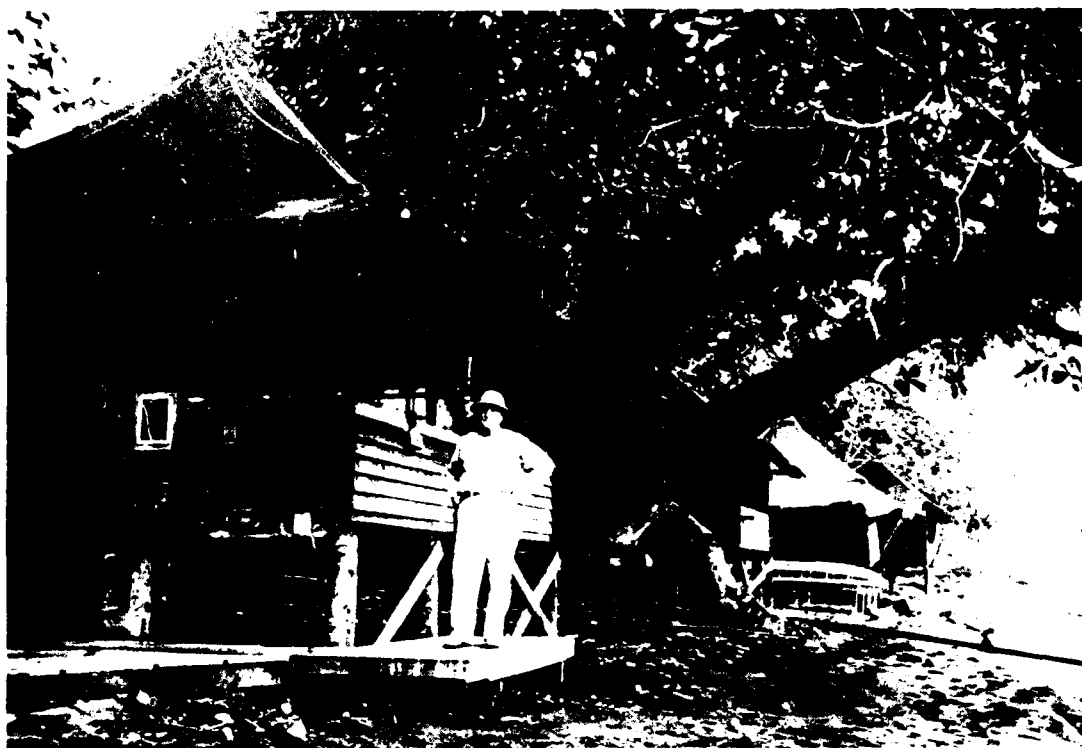


FIGURE 169. Lt. Col. Homer K. Nicoll, MC, Commanding Officer, 13th General Hospital, standing beside his quarters, Finschhafen, New Guinea, June 1944.

The need to help these hospitals with additional personnel is simply to enable them to perform their professional duties satisfactorily, not to spare them hard work. They are all willing to work to exhaustion when the need arises, but after a certain time the caliber of their work suffers. It is hoped that teams of surgical and medical officers can be attached to hospitals opening in new areas, to augment their staffs for the first 2 months after they start admitting patients.

The Chief Surgeon, USASOS, approved the reinforcement of hospitals in periods of overloading and transmitted his approval to the Surgeon, Intermediate Section, for consideration. No action was necessary, as the war moved on and these hospitals did not become overcrowded.

Leyte. Letters written to General Denit in December 1944 and early January 1945 by Colonel Thomas, when he was attached to the Sixth U.S. Army on temporary duty and served as acting medical consultant to the Sixth U.S. Army, indicated, as he expressed it, "how the pieces were gradually falling into place." The letters contained, among other items, the following (summarized) comments on the hospital situation.

Early in December, the Sixth U.S. Army was almost ready to relinquish its responsibilities to the Eighth U.S. Army and to ASCOM or USASOS. Two evacuation hospitals, the 36th and 58th, the field hospitals, and the collecting and clearing companies would then come under the Eighth U.S. Army. At

the same time, general hospitals, station hospitals, the 27th Medical Laboratory, and the responsibility for evacuation of patients from Eighth U.S. Army hospitals would come under Base K (Leyte).

Clearing the area, sawing down trees, building roads, drainage, and putting up buildings, including plumbing and lighting, would have to be accomplished without benefit of heavy equipment and with only irregular native labor to help. Vehicles were being taken from the hospitals for the motor pools. The 133d General Hospital, for instance, came in four LST's, borrowed huge trailers, and moved all their equipment into a slightly cleared area. They were ordered to take patients in 3 days and did so. On the other hand, the 44th General Hospital came in with pup tents and K-rations. The 13th General Hospital came in with tenting, basic mess equipment, a jeep and water trailer, and one truck, and all their equipment was in the harbor for want of transportation from the docks to their area. All of these difficulties developed because engineering problems were several times as great as had been anticipated, and there were no engineers for hospitals. Even if the hospitals had had their own medical engineers, Colonel Thomas added ruefully, they would probably have been taken away from them, on the ground that those who had were being obliged to give to those who had not.

Three general hospitals, the 44th, the 133d, and the 118th, landed on the beaches at Leyte during a heavy Japanese air raid on D-plus-27-day. Negotiations for a favorable building site had been carried on with maps before the landings, but these arrangements had to be *countermanded under the pressure of battle needs*. The 118th and 133d General Hospitals were located near the main road running along the eastern edge of the island, and the 44th was placed near three small airstrips formerly used by the Japanese, and intended for reconstruction for use by U.S. planes. Actually, these airstrips, which were suitable for the light, small Japanese planes, turned out to be on soft earth which defied and finally, after weeks of frantic work, defeated the engineers.² Meanwhile the Japanese dropped paratroopers into this area, and the 44th General Hospital found itself defending, from rapidly dug trenches, part of the frontline perimeter. By bad luck, these trenches were dug in an area which was heavily impregnated with hookworm (*Ancylostoma*) larvae and *Endamoeba histolytica* left from a recently evacuated native village. The ensuing epidemic of acute hookworm infestation will be described later.

In the same letter, Colonel Thomas reported that the Sixth U.S. Army had conducted several dispensaries for native civilians as well as two civilian hospitals, one beyond the headquarters and the other in an old schoolhouse (fig. 170) near the 36th Evacuation Hospital. They were staffed by personnel of the 250-bed station hospitals, with a census of about 120 patients each, which were supposed to be absorbed by the 133d General Hospital. Personnel of the PICAU (Philippine Island Civil Affairs Unit) had no idea how medical care was to be supplied to the Filipinos or how to decide who was to hospitalize

² This delay resulted in 10 days without any air defense after the Navy with its flattops had been ordered away.



A *



B

FIGURE 170. 98th Evacuation Hospital, Leyte, Philippines. Islands, courtesy Philippine civilians. A, Entrance. B, Ward area.

them (fig. 171). It was understood that six Filipino physicians were working in the area, but obviously they were not enough to take over.

The 44th and 118th General Hospitals, it was reported later, were getting their equipment slowly. The 124th Station Hospital was helping the 36th Evacuation Hospital. The 133d General Hospital was building while at the same time housing 400 patients. All the prospects of engineer help consisted of blueprints. Colonel Thomas was experiencing difficulties in some of the forward hospitals because of transportation problems; on some of his trips, water buffaloes were used to ferry his vehicle across streams.

Colonel Thomas reported that Colonel Hagins, at his suggestion, was planning to attach a team of one officer and three technicians from the 26th Medical Laboratory to an evacuation hospital which was to go in on D-plus-1-day or D-plus-4-day behind each of the corps in the next operation; the laboratory would revert to its parent unit when that unit was ready to function. These laboratories would provide service similar to the excellent service provided by 1st Lt. Walter L. Barksdale, SnC, on detached service, who provided the only clinical laboratory service available until the 27th Medical Laboratory began to function. He helped both the survey units and the hospitals. Colonel Hagins was very much pleased with his work, and the commanding officer of the 36th Evacuation Hospital wanted to keep him.

Medical care near the front.—During his tour on Leyte, Colonel Thomas paid several visits to the front. The Consultant in Medicine, Sixth U.S. Army, had returned to the Zone of Interior on rotation, and the named request for his replacement had been refused. Colonel Thomas therefore performed some of the duties of Army consultant in medicine during this period.

Transportation was provided for his various missions, although it was in short supply. The poor condition of the narrow muddy roads and the paucity of good airstrips also made for difficulties. One trip was typical. At dawn, a small L-5 observation plane taxied along the beach to the tent in which Colonel Thomas was billeted and flew him across the island to the Ormoc (MacArthur) area, where it landed in a flat pasture. Fighting was still brisk on this side of the island (fig. 172), but the jeep driver knew—or said he knew—where to drive very fast to get by Japanese snipers. The field hospital, set up in a churchyard at Ormoc, where the consultant spent the night, was badly bombed the following night. Even the Sixth U.S. Army Headquarters area on the east coast was frequently darkened by air alerts. Once, a Japanese plane was shot down in clear sight and fell into the sea a quarter of a mile down the shore while most of the staff was at mess. The small group of U.S. night fighters spent many hours in the air.

In a report to General Denit early in January 1945, Colonel Thomas made the following (summarized) observations on medical care near the front:

In the Ormoc area (the combat zone on the western side of Leyte), he was much impressed with the commanders of two divisions from the Pacific Ocean Area. They were very medically minded and appreciated the importance of preventive medicine measures in the present campaign. Among these meas-



FIGURE 171. Dispensary No. 2 operated by Philippine Island Civil Affairs Unit 21, Manila, Philippine Islands, February 1945.

ures were daily replacement of socks; provision of spectacles for the troops, who were chiefly older men; dental care; provision of morphine-filled Syrettes for line sergeants; provision of waterproof paper bags to use in helmets when diarrhea developed in foxholes; taking a clearing company augmented by a portable surgical hospital forward with the troops; cleaning up areas; and the use of vitamin tablets. Both of these line officers were very enthusiastic about their medical officers and enlisted men, and they told about lifesaving surgery in the case of one of their valuable officers.

Colonel Thomas was not too impressed with the medical service provided in the clearing companies and field hospitals which he visited in one area. The medical officers were chiefly young, poorly trained physicians, who had fallen into careless, superficial habits because of lack of facilities, pressure of work, and absence of professional supervision. They had to keep seriously ill patients because of the long and extremely difficult evacuation. In another area, the field hospitals were better, and the service was good.

A laboratory visited had good talent but needed to be pulled together. Lieutenant Barksdale was being transferred to it from the 36th Evacuation Hospital, which was closing down.

Hospitals for natives. While he was at Port Moresby, Colonel Thomas visited a hospital for natives run by ANG AU (Australian New Guinea Administrative Units) (fig. 173). There were numbers of these small hospitals scattered through different areas of New Guinea, each able to house about 20 patients and each capable of treating a large number of outpatients. For the duration of the war, ANG AU had been taken into the Australian Army.



FIGURE 172.—Collecting station near frontlines at Ormoc, Leyte, Philippine Islands, December 1944.

At the hospital in New Guinea, there were 2 young medical officers, an experienced warrant officer, and 10 attendants on duty. Several of the attendants were able to speak English as well as pidgin English.

Construction of these hospitals varied from area to area, but in the one at Port Moresby, the buildings had chiefly tin roofs and walls and wooden floors. In addition, three small wards, with thatched roofs and open sides, were built out on poles over the water. This arrangement was necessary because the shore rose abruptly from the beach, and, as frequently happens in New Guinea, there was a paucity of level ground on which to build. The patients lay on the floor, on blankets or on thin, palm-woven mats. Colonel Thomas was told that they preferred this to any kind of bed.

The various diseases were more or less segregated, with dysentery and tuberculosis in one ward, lymphopathias in another, and tropical ulcers and yaws in another. There was a large group of arthritides, some from dysentery and many from the indigenous strain of gonococcus which was said to be very widespread but only occasionally to cause urethritis or ophthalmia. Most patients had hookworm; one was said to have 1,300,000 red blood cells per cubic millimeter and 15 percent hemoglobin; the highest healthy hemoglobin was 70 percent.

Malaria knocked these patients down when they moved to new areas and became infected by a strain different from the one to which they had immunity. The Australian medical officer on duty intended to try our therapeutic dosage of Atabrine, as he was not supposed to use quinine.

Tuberculosis was said to be on the increase, hygiene being practically impossible to teach and many tribes back in the jungle not yet having had any contact with white men. The natives in Japanese territory were faring badly, as their food was taken from them, and many developed beriberi and scurvy. Filariasis was encountered, and Colonel Thomas observed an instance of brawny edema of the breast said to be due to this condition, though in his opinion it looked more like tuberculosis. He saw little skin disease, though one patient had *tinea imbricata* covering the whole body. There was said to be a great deal of pneumonia, which responded well to sulfadiazine.

LABORATORIES

The whole laboratory problem in SWPA was difficult. Each hospital had its own laboratory, which in station and evacuation hospitals was usually under the control of a young medical officer with no more than the average medical training. Technicians were locally trained, and, in many instances, laboratory work was not reliable.

This was not the situation, of course, in units set up primarily as medical laboratories (fig. 174). One such unit (or a part of one) was usually assigned to each base, but it had no direct official contact with the laboratories of the various hospitals in the base.

Colonel Thomas recommended that a consultant be appointed to arrange for correlation of laboratory work throughout each base and for proper training of technicians to be appointed to medical laboratories. Although this recommendation was not approved, a school was set up in New Guinea to train technicians in tropical medicine procedures. It was a considerable time before this school was established, and, when it was opened, the number of already fairly well trained technicians sent to it learned a great deal of tropical medicine which they did not need in that particular area.

Colonel Thomas concluded that if he were confronted with the same situation again, he would persist in attempts to set up local arrangements in each base whereby well-trained laboratory personnel could instruct poorly trained personnel with the simple purpose of improving their techniques in such everyday problems as the diagnosis of malaria by thick-smear preparations. In a fast-moving war, there is time only for first things first.

Medical general laboratory.—When it was learned in 1944 that a request had been made to The Surgeon General for a medical general laboratory to be sent to SWPA, plans were made for its most effective utilization. Colonel Pincoffs' idea was that a 250-bed station hospital should be erected in close proximity to it and should function as the Hospital of The Rockefeller Institute functions in connection with the large Institute laboratories. Patients with



FIGURE 173. Natives receiving treatment in hospitals operated by ANGAC.

rare clinical conditions could be assembled in this hospital and would receive superior clinical observation and treatment while they were under study by the special personnel and with the special equipment available in the large general laboratory.

There were a number of practical difficulties attached to this plan, but it was thought that they could be overcome. One concerned rank. The medical general laboratory would be under the command of a Regular Army colonel of real professional stature, while the clinical problems would be the responsibility of the chiefs of the medical and surgical services in the station hospital, who would be Reserve majors in the Medical Corps. This difficulty never arose because the laboratory never functioned in the capacity intended. It could have been settled readily by the issuance by General Denit of instructions to the commanding officer of the laboratory to support clinical research in the hospital.

Another objection to Colonel Pineoff's suggestion was that the construction of the proposed station hospital would be a time-consuming operation, for which no personnel would be available except the personnel of the hospital and the general laboratory. By the time the construction work was completed, it was pointed out, the war would have progressed a long way up the island and possibly even into the Philippines. This is just what did happen. By the time this unusual organization was ready to function, the war had almost slid off the tip of New Guinea and was about to invade the Philippines.

The medical general laboratory therefore split up into sections and followed the invading forces as best it could. Its officers were very useful in studying special problems on the spot as they developed, and later they per-

formed good services on the outskirts of Manila. By this time, conditions in local laboratories had greatly improved.

While this plan had been in preparation at headquarters, Colonel Thomas, then in New Guinea, sent in a request for Maj. (later Lt. Col.) A. McGehee Harvey, MC, of the 118th General Hospital, to be made available to supervise a special clinical research problem in a New Guinea hospital. Instead, Major Harvey was recruited by the Office of the Chief Surgeon, Headquarters, USASOS, to serve as chief of the medical service in the research station hospital planned, an assignment in which his special abilities could have been fully used. Maj. (later Lt. Col.) Frank Glenn, MC, was recommended by Colonel Parsons, Consultant in Surgery, USASOS, to serve as chief of the surgical service.

As time passed and the research unit was not ready to function, Major Harvey was made available temporarily for the project for which he had been requested and joined with Capt. (later Maj.) Frederik B. Bang, MC, in an excellent clinical and laboratory study of the relation of Atabrine to atypical lichen planus (p. 549).

CONVALESCENT CARE IN NEW GUINEA

The general care of soldiers no longer ill enough to require hospitalization but much too weak to return to the frontlines was a problem encountered in every hospital visited in New Guinea. On 29 February 1944, Colonel Thomas submitted the following (summarized) report on the problem to the Chief Surgeon, USASOS, directed to the attention of Colonel Pincoffs, Chief, Professional Services:

1. The important problem of convalescent care of patients in New Guinea involves features peculiar to the area.

2. A beginning has been made by setting up the 139th Station Hospital (50 T/O—150 actual beds) in Oro Bay (Base B) (fig. 175) and the 90th Station Hospital (50 T/O—150 actual beds) in Lae (Base E). Similar units are needed in Milne Bay (Base A) and Finschhafen (Base F), even if general hospitals are later established in these areas, since all patients who remain in station hospitals 2 weeks or more require supervised physical reconditioning before they return to their units. Tent facilities can be expanded as the need becomes evident.

3. The supervision and direction of patient activities in the proposed units should be in the hands of especially adapted medical officers who are outstanding in physical stamina, leadership, knowledge of military discipline, and comprehension of the psychology of the soldier. This type of officer is not common. Much might be done by training promising young medical officers.

4. At the present time, an excellent convalescent unit is functioning at the 105th General Hospital, and a similar unit formerly functioned at the 42d General Hospital. Essential practical experience was gained in both



FIGURE 174. St. Medical Laboratory, Australia. A. Autopsy room. B. Serology. C. Laboratory in fluids. D. Pathology.



FIGURE 171. Continued. E. Bacteriology. F. Chemistry and hematology. G. Supply room. H. Officers' quarters.



FIGURE 175. 139th Station Hospital, Oro Bay, New Guinea, June 1944.

hospitals, and officer personnel of other general and convalescent hospitals would profit by being attached to them for short periods of observation and instruction in this specialty.

5. Three specific recommendations were made, as follows:

a. That an officer experienced in commanding units for convalescent care be designated to organize the operation of the 90th and 148th Station Hospitals.

b. That a small hospital installation be constructed as soon as possible in Base F to function similarly and to grow in size as needs develop. These hospitals will not attempt rehabilitation of patients suffering from nervous disorders, although patients with mild conditions of this kind might well be able to return to duty after a short stay.

c. Station hospitals intended for convalescent care should be located in areas in which facilities for outdoor work and recreation are available.

The only direct action taken on these recommendations was the provision of two large convalescent hospitals in the Philippines, which provided much needed facilities for the overflow of general hospitals, leaving their beds for more acutely ill patients.

EVACUATION

The evacuation of sick and wounded casualties from forward bases in New Guinea to Intermediate Section and thence back to Australia was an important problem, about which more than a little confusion arose. Once, for instance, a station hospital in the base at Oro Bay (Base B) sent patients

for evacuation to a general hospital in Australia. A station hospital in the base at Port Moresby (Base D), however, where these patients were awaiting air or water transportation, studied them again and sent them back to duty with their unit in Base B. In other instances, an air force unit commander refused, on the advice of the unit medical officer, to keep patients, and the process of evacuation was begun again for them.

These and similar experiences made it evident that final decision concerning evacuation must be left to one station hospital or another, and it was decided locally that the hospital which studied the case earliest in its course and was most familiar with the unit status should make the final decision. After the base surgeon had approved the decision, it would not be changed in any station hospital which subsequently received the patient. Under the evacuation conditions peculiar to New Guinea at the time, this procedure worked smoothly and efficiently.

Confusion also arose when hospitals in advance sections and bases evacuated patients to general hospitals with "G.H." inscribed on both the Field Medical Card (Form 52c) and, in red pencil, on the Field Medical Record Jacket (Form 52d). Many errors were made, some due to hurried evacuation, some due to the unfamiliarity of units newly arrived in New Guinea, and some to the paucity of professional personnel in small forward hospitals with the qualifications and experience to make such decisions.

It became evident that final decisions must be made by the first large hospital to which the casualties were admitted, since there would be available in it both the professional staff and sufficient time for proper evaluation of the needs of each case. Correction of these improper policies had not previously been effected because authority to instruct or correct advance bases rested in Headquarters, USASOS.

The principle requiring reevaluation and sorting of patients in each hospital in the line of evacuation was sound in itself, but in New Guinea it led to delay and, many times, to improper therapy. In some cases, for instance, casts had to be removed many times.

Since responsibility for proper treatment and disposition rested on each hospital, most hospital staff members were reluctant to release patients to the rear without first attempting to accomplish as much treatment as possible. This policy caused delay in the patients' arrival at general hospitals and sometimes actually jeopardized the end result. Sorting of patients, if properly carried out, requires mature judgment and wide clinical experience. If these requisites are available, sorting can be properly accomplished in several hours. It was necessary to emphasize repeatedly that medical officers should not attempt final sorting or treatment of patients suffering from clinical conditions beyond the scope of their professional training to handle.

In a report to the Chief Surgeon, USASOS, dated 27 January 1944, Colonel Thomas described this situation and made certain specific recommendations which may be summarized as follows:

1. Since evacuation follows the line of supply both by air and water and since the line of supply changes for military reasons, the whole problem of evacuation requires careful supervision on the part of base and port surgeons. The difficulties must also be called to the attention of, and fully explained to, the Surgeon, Intermediate Section, and surgeons of all bases and ports.

2. Surgeons of bases and ports should refer individual cases for factfinding to suitable consultants whenever they are available.

3. Base surgeons, acting with the advice of suitable consultants, should designate individual hospitals in their bases for the treatment and disposition of certain types of cases.

4. Problems of air evacuation should be freely discussed between the local flight surgeon and the base or port surgeon, to settle such matters as conditions unsuitable for air travel; the selection of patients who require special preparation or care in transit; facilities for treatment which may or may not be available in transit; and care of property such as clothing, bed clothing, litters, and special equipment which may be in short supply.

5. Ship platoon surgeons and other medical officers charged with caring for patients during evacuation by water should report to the local base or port surgeon's office for discussions and advice.

6. Reports should be made to the Chief Surgeon, USASOS, through channels, by commanding officers of station and general hospitals, these reports to contain pertinent facts concerning the condition of patients evacuated to their hospitals.

As a result of these recommendations and observations, an officer was appointed to supervise evacuation throughout the theater from the Office of the Chief Surgeon. Thereafter, evacuation proceeded in a much more orderly and efficient manner.

Utilization of bed space.—By the middle of the summer of 1944, the Chief Surgeon had become more than usually concerned over the difficulty of providing sufficient hospital bed capacity for casualties in forward areas. In an area composed of many small bases, some of which developed later into very large supply and staging areas, the problems of transporting, building, and supplying hospitals were not simple.

There was a constant struggle with staff officers at General Headquarters and other headquarters to obtain authorization for sufficient hospital beds in the planning stages. Every step was difficult. There was never enough transportation or engineering to meet all the needs, and priority always went to combat projects.

The scarcity of hospital beds required that patients be evacuated at the earliest moment that was safe and sensible. Basic rules of evacuation, however, sometimes had to be transgressed, and patients who should not have been moved, sometimes because their condition was too serious and sometimes because it was not serious enough for evacuation, were sent long distances to the rear. On the other hand, at every hospital, ward officers were guilty of retaining patients longer than was really necessary.

To augment faster disposition of patients, Colonel Thomas prepared the following (summarized) letter which was approved by the Chief Surgeon on 2 August 1944 and was forwarded to hospitals through base section surgeons:

1. While every effort must be made to retain in the area personnel capable of performing useful functions, valuable bed space should not be utilized for the care of men with time-consuming conditions when their subsequent usefulness is doubtful or likely to be seriously impaired.

2. In a recent publication from the Office of the Surgeon General, it was stated that patients who required more than 120 days of hospitalization would be evacuated as quickly as possible, the majority between 30 and 60 days and all by 90 days. In the SWPA, however, only 27 percent of evacuees had left the area by 60 days and only 54 percent by 90 days, while 28 percent were evacuated after 120 days. Obviously, patients requiring evacuation were being held in the SWPA much too long.

3. It is therefore desired that all patients be carefully screened, with a view toward evacuating those who will require an unusually long convalescence as soon as they can be transported safely. Such patients should be brought before a disposition board early, and all other administrative procedure should be completed promptly. These cases should be reported on the Weekly Bed Status Reports as awaiting evacuation to the Zone of Interior, so as to avoid all possible delays in evacuating them as soon as they are transportable. Only patients who give promise of being returned to duty within the area evacuation policy should be retained in hospital.

NURSES

As soon as the station and evacuation hospitals in New Guinea had their tents and portable hospitals erected and the base had been cleared of the last lurking and usually starving Japanese, the nurses assigned to these hospitals were sent for (fig. 176). Even then, the danger from enemy snipers and air attacks, while less, still existed. Electricity was provided soon after the hospitals were set up, but, every night, the buildings were kept black most of the time for fear of bombings.

Living conditions were always rugged, although every effort was made to make them tolerable (fig. 177). The overall motif was mud. In the early rush for locations for various installations, hospitals had to take what they could get, and their personnel had to get used to mud. For a long time, there was no running water. Shower baths were improvised from oil drums or Government-issue cans, but they made little impression on the mud. Facilities for laundry were scant. Security measures were complicated.

Even after transportation to the base was available and nurses were housed, there were no facilities for them to visit other units. Each little group was isolated, and work, laundry, and letter writing were the only occupations. When casualties were received in large numbers, there was time only for work.

Many of the nurses suffered from physical and nervous fatigue, but the sick rate among them was very low, and their efficiency, sense of duty, and



FIGURE 176.- Nurses from 251st Station Hospital, who were first to reach New Britain, 24 July 1944.

cheerful endurance of hardships were high. Every unit visited was proud of its nurses, and nurses continued to catch up with their units as soon as possible.

On one occasion, a C-47 carrying nurses and officers across the Coral Sea from New Guinea fell into the ocean, and the plane sent to search for it did not return.

VISITORS TO THE AREA

Visitors to the Southwest Pacific were always welcome but were not numerous, for a variety of reasons. Seats in planes crossing the Pacific were few and hard to obtain, and repeated requests for visits by professional personnel to New Guinea were not answered.

In September 1944, a large part of Colonel Thomas' time was spent with Lt. Col. (later Col.) Francis R. Dieuaide, MC, from the Office of the Surgeon General, in New Guinea and later in headquarters in Brisbane. His visit, the only one in almost a year by a medical or surgical consultant from this office, was greatly appreciated. His fresh point of view was stimulating, and his years of experience with tropical diseases in China provided background for interesting comparisons.

When the war in Europe was finally won, The Surgeon General, accompanied by the chief of his Preventive Medicine Service, Brig. Gen. James S. Simmons, arrived to inspect the area (fig. 178). The Surgeon General visited

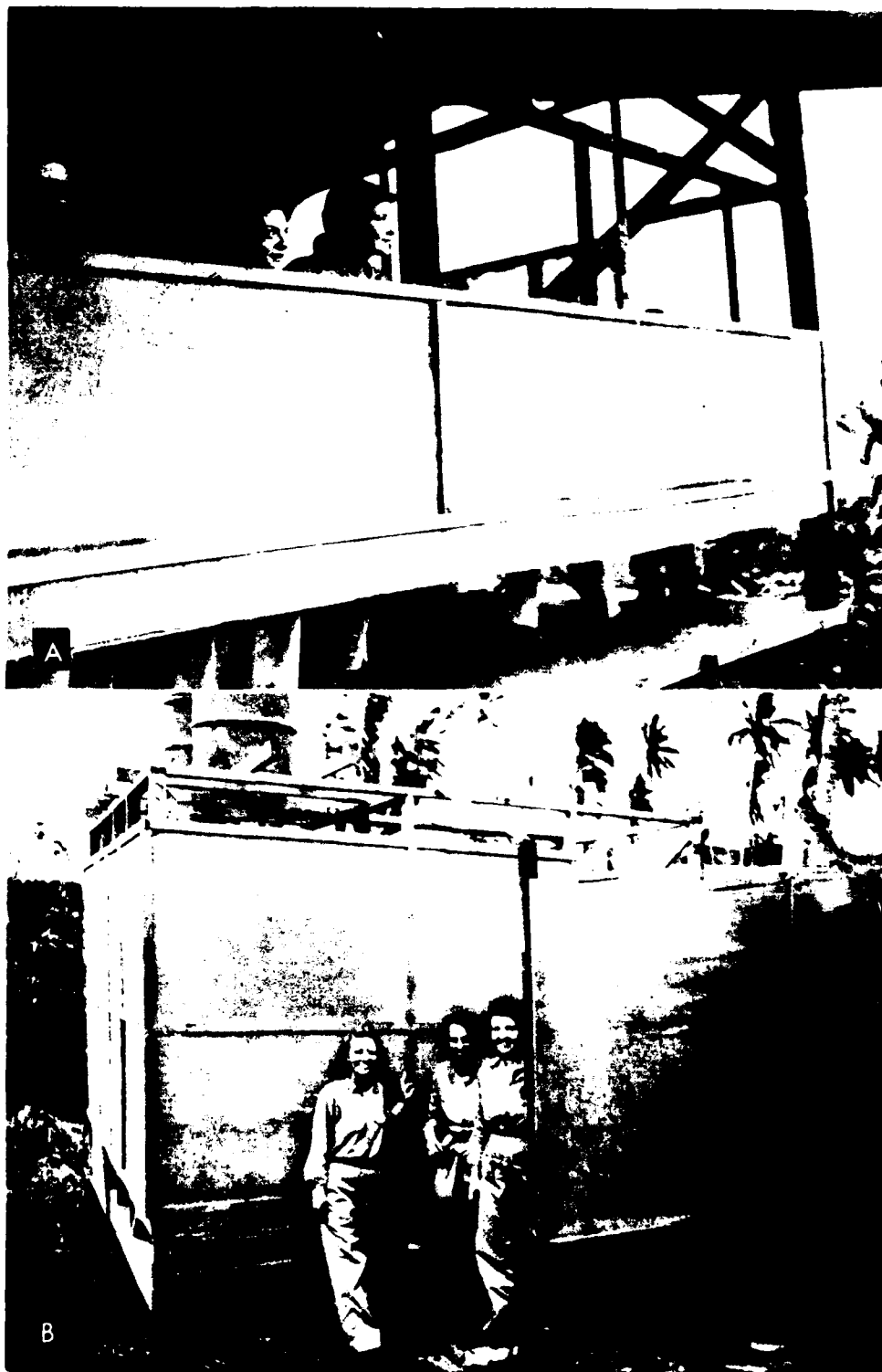


FIGURE 177.—Nurses at 30th Evacuation Hospital, Parang, Mindanao, Philippine Islands, May 1945. A. Nurses quarters. B. Shower bath improvised with oil drums.



FIGURE 178.— Maj. Gen. Norman T. Kirk, The Surgeon General (with tropical helmet), and Brig. Gen. John M. Willis, Chief Surgeon, USAFPOA, extreme right.

the surgical services, particularly those on which orthopedic casualties were under treatment, in a few rear-area New Guinea bases, after which he went to Leyte, where USASOS Headquarters had been left when the fighting moved to Luzon. His request to the Commander in Chief of the Allied Forces, SWPA, for permission to visit his forward headquarters was refused on the ground that there were no tents or officers available to take care of visiting dignitaries.

Meantime, Colonel Thomas spent several days with General Simmons, who was very much interested in the work being done by the malaria control units on schistosomiasis (fig. 179). He was, however, somewhat disdainful of the small and weak Preventive Medicine Section.

When a request for permission to visit Luzon was denied¹, General Kirk, The Surgeon General, and General Simmons left the area. There was universal regret that their visit had not occurred 2 years earlier.

BLOOD BANK

During his tour in Leyte in December 1944, Colonel Thomas learned from Major Glenn, Assistant Surgical Consultant, Sixth U.S. Army, that large



FIGURE 179. Brig. Gen. James S. Simmons, center, visiting 19th Medical Laboratory where a study of schistosomiasis is in progress, Col. Dwight M. Kuhns, MC, extreme right.

amounts of blood had been required by recent Navy casualties; several had required 3,000 cc., and one had received 5,000 cc. At this time, 80 pints daily were being received from the Zone of Interior, with additional amounts from Base G (Hollandia) and Base H (Biak). The prospect was that the needs in Base M (San Fabian) would be even greater, since there were likely to be more shell-fragment wounds and fewer rifle wounds.

The situation in respect to blood bank supplies was somewhat complicated. Capt. Albert T. Walker, MC, USN, Surgeon, 7th Fleet Amphibious Force, had not heard officially about the visit of the blood bank officer from the Zone of Interior and was somewhat annoyed. Captain Walker was justifiably proud of the past blood bank performance in the SWPA, and, if possible, he would like it to continue as a local operation. At the moment, this seemed a formidable undertaking to Colonel Thomas. LST 464, which had been supplying the blood, was busy with casualties from harbor and Navy personnel and could not get donors. In addition, there were other problems of transportation, supplies and containers. It was Colonel Thomas' idea that the major portion of the blood needed by the task force should be supplied for the invasion by the San Francisco Blood Bank, with augmentation from local supplies as necessary (fig. 180).



FIGURE 180. Whole blood in refrigerated container delivered to Parang by L5B light aircraft, Mindanao, Philippine Islands, May 1945.

SUPPLIES

In spite of the obvious difficulties and problems attending their delivery, there were few shortages of supplies in the Southwest Pacific. Certain medical supplies were short in some items for the first time in Tacloban (Base K). Here such drugs as emetine, Diodoquin (diiodohydroxyquin), hexylresorcinol crystoids, and Fuadin (stibophen), as well as some surgical supplies, became exhausted. The shortage was promptly relieved by items flown from San Francisco. The shortage was accounted for by the unexpectedly long and extensive Leyte campaign and the constant rerouting of shipping (fig. 181).

CLINICAL INVESTIGATION

Clinical investigation was not encouraged by Headquarters, USASOS. It is true that medical personnel was always in short supply in the SWPA, particularly during the first 2 years. It is also true that medical officers in units stationed in forward areas did not have appropriate training for clinical research. There were a number of occasions, however, when it seemed to the medical consultant that, with very little effort, suitable officers could have been sent up to well-established station hospitals in which they could have made useful observations and collected valuable information.

Recommendations to this effect were seldom approved. One of the exceptions was the study made by Major Harvey and Captain Bang on atypical lichen planus (p. 549). Captain Bang had been sent to the area to pursue research in malaria. His reports went directly to the Chief, Professional Serv-



FIGURE 181. A medical supply depot in the Philippine Islands.

ices, Office of the Chief Surgeon, Headquarters, USASOS, and were not seen by the Consultant in Medicine.

A skin test for filariasis was developed at the 52d Evacuation Hospital while stationed on Woodlark Island, New Guinea (p. 550).

Various clinical observations were made on early acute cases of schistosomiasis, and an epidemiological survey of a large outbreak of hepatitis was carried out. On the whole, fortunately enough, the war moved too far too fast to permit much investigation.

Part II. Clinical Considerations

GENERAL OBSERVATIONS

Before proceeding to the discussion of special diseases, it might be well to outline a few of the variety of problems which medical officers encountered in the Southwest Pacific, particularly after the invasion of the Philippines. Many of them were residual.

The tropical native houses seen in the Philippine Islands as well as in New Guinea consisted of a single room raised 4 or 5 feet above the ground on stout bamboo poles (fig. 182). This elevation insured a certain amount of protection against such unwelcome visitors as snakes, ants, and pigs. Mud was less of an annoyance, and free ventilation was permitted in the usual heat of day.

Sanitary arrangements were primitive. One sliding floorboard provided egress for all refuse and excreta, which eventually were cleared away by the pigs and dogs or spread around by surface rainwater. Under these conditions,



FIGURE 182. Elevated native house in the Philippine Islands. Note use of corrugated iron patches on thatched roof.

it was small wonder that each native as well as domestic animals carried three or four varieties of intestinal parasites, in addition to flukes and mosquito-borne organisms.

In New Guinea, the infrequent, small native villages usually were situated in little clearings back of the forest, and they constituted no problem in sanitation to the U.S. Army except through stream pollution. By contrast, in Leyte, most available ground was raised above surrounding swampland used for cultivation of rice, and this land was spotted with groups of these little houses. Since the Filipino was a respected ally of the United States, there could be no invidious regulations and no off-limits areas. Fortunately, the hospitable natives had little to offer U.S. soldiers, and the soldiers had little time or energy left from their exhausting military duties. Otherwise, few would have escaped some tropical ailment, and a considerable number, of course, did not escape.

In Leyte, the area assigned to the 44th General Hospital was heavily impregnated with hookworm larvae and *E. histolytica* left from a recently evacuated native village. Within a week or two, there was an outbreak of febrile bronchitis and general malaise accompanied by eosinophilia. It was suspected, and later proved, that the condition represented an outbreak of early, severe hookworm disease. At the 133d General Hospital, the residuary legacy was a large crop of *E. histolytica* infections. The 118th General Hospital, which had landed at the same time as the other hospitals, encountered schistosomiasis.

Observations at the 76th Station Hospital in Leyte were typical. Diarrhea accounted for over a third of about 3,000 admissions. Dysentery accounted for 400 admissions (bacillary, mostly Flexner type, in 190 cases; amebic, all trophozoites, in 21; and cause undetermined in the remaining cases). There were 130 cases of common diarrhea and 475 cases of acute gastroenteritis. The cause was not determined in any of the cases of this group, but it included syndromes that in some hospitals were diagnosed as influenza or dengue. Other diseases observed included malaria, poliomyelitis, balantidiasis, giardiasis, ulcerative colitis, and regional enteritis. There were three cases of syphilis, all new, and some other venereal diseases, but no gonorrhea. A possible case of scrub typhus with rising *Proteus* ONK titer was also observed.

In some hospitals, a condition was observed which for the first 2 or 3 days looked like influenza. Abdominal cramps and diarrhea then developed, but neither amebae nor salmonellae could be found in the stools. Virus studies were planned for these patients.

MALARIA

General considerations.—Malaria was not a disease which could readily be dismissed. In various areas of New Guinea, the malaria rate was as high as anywhere in the world. A good many of the natives were infected with filariasis, practically all of them had intestinal parasites, and malaria infection was almost universal. It was impossible to prevent contact of the U.S. soldiers with them, for they were very useful to the Army in helping to clear the jungle (fig. 183) coconut groves and in applying thatched roofs to rapidly erected buildings of native type.

The particular strain of *Plasmodium vivax* encountered in New Guinea was extremely virulent, and mosquito control was particularly difficult under the conditions imposed by war. The military program was generally to neutralize the Japanese troops in a given area; to turn the base over to USASOS; to push back the jungle to make room for staging areas, airstrips, supply dumps, and hospitals; and, at the same time, to rid the area of malarial mosquitoes. The soldiers worked under great difficulties. The heat was intense. In some areas, it rained almost daily, the downfall totaling 180 inches per year in the Milne Bay area. Bulldozers and labor battalions worked in shifts around the clock, and their rations were limited to what could be shipped infrequently from Australia, where very little canned food was available because not much of it was used.

Preventive measures.—It is an amazing fact that within 3 or 4 months, the U.S. malaria survey and control units, with the help of Army engineers, were able to convert the most highly malarious area in New Guinea, around Milne Bay, to an area in which the monthly malaria rate was frequently lower than anywhere else in the island. This was accomplished by a variety of precautionary measures. Natives working on Army projects were moved away from them for distances of 2 miles or more when daylight began to wane and



FIGURE 183. Pushing back the jungle.

malarial mosquitoes began to appear in numbers. Mosquito bars were required. Some outfits patrolled their areas and moved sleepers away from the bars when they had rolled against them. It was required that the body be constantly covered with clothing and that the shirts be worn with collars buttoned and sleeves rolled down, which seemed inhuman in the tropical heat. Repellents were used on exposed surfaces. These regulations were difficult to enforce in an isolated spot like New Guinea, but those who escaped being infected with malaria, in spite of visiting new bases before malaria control measures were in satisfactory operation, did so by obeying these regulations as well as by the use of Atabrine.

Atabrine administration. For a long time, the technique of administration of Atabrine was faulty and left much to be desired. To the ordinary enlisted man, this rule, like the others for mosquito control, was senseless. A silly rumor spread among the troops that this drug destroyed libido and potency. They heard that Atabrine sterilized the bloodstream of malaria, and it was only a short step to the belief that it also sterilized men. Troops pretended to swallow the pills but spit them back into the cup or spit them out along the road as they walked away from the Atabrine line. It took a long time and much discipline to discover and thwart all the tricks employed to evade suppressive treatment (Fig. 184). Men in the Army Air Forces were particularly casual in their disregard of malaria control procedures. Before the lesson was learned the hard way, the 32d Division and other units became completely riddled with malaria and had to be sent back to Australia to be demalarialized.

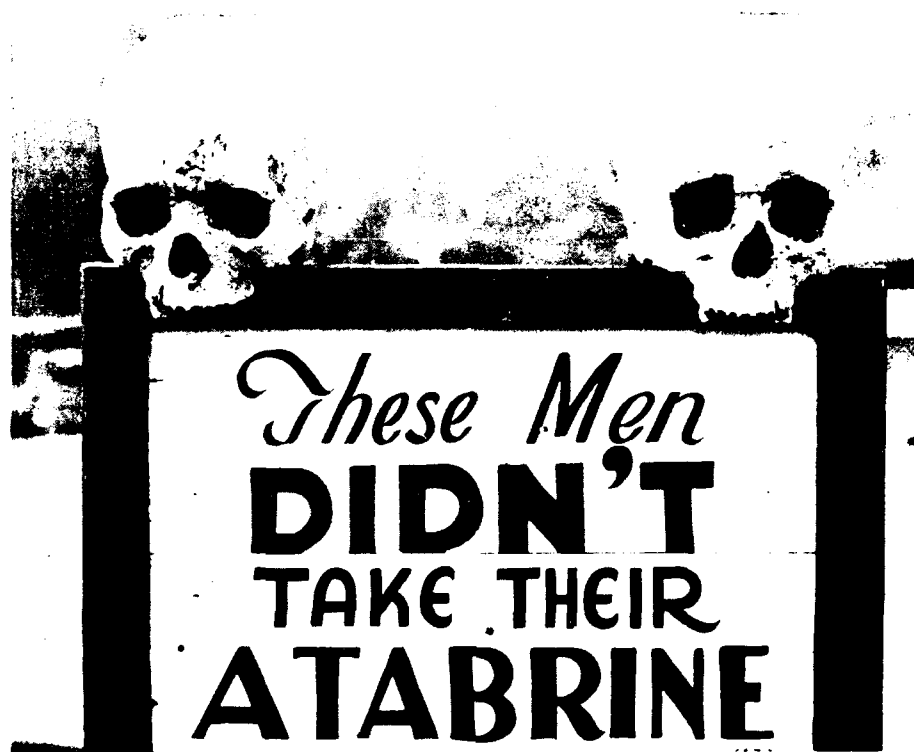


FIGURE 184. Atabrine publicity campaign, 363d Station Hospital, March 1944.

Treatment. The management of malaria in SWPA is a fascinating historical episode, the complete description of which is beyond the scope of this chapter. Quinine, which formed with Atabrine and Plasmochin naphthoate (pamaquine naphthoate) the so-called Middle East treatment, was still the therapy of choice in the British and Australian Armies. Quinine, however, was in short supply for U.S. Army personnel. On the other hand, the use of Atabrine was entirely new, and the original dosage—6 pills a week—left much to be desired. It was eventually determined that suppressive doses, taken regularly, eliminated all forms of malaria other than that caused by *P. vivax* and suppressed clinical symptoms of that variety during therapy. The dosage for treatment of malarial attacks had to be established by trial and error. It is of considerable interest that the schedule finally worked out in SWPA, of large doses for several days (at first, 0.2 gm. every 4 hours) followed by maintenance doses, proved to be identical in principle, though slightly larger in dosage, than the schedule elaborated in the United States, with the help of blood-level determinations on treated patients, by Dr. James A. Shannon. Lieutenant Bang, equipped with a photofluorometer, was able to provide accurate data for the final determination of optimum dosage schedules.

Research studies. Malaria received more attention and had more manpower effort devoted to its prevention than all other diseases put together (fig. 185). The results were good. There were only two or three cases of cerebral malaria and only a few of blackwater fever. It is not too much to say that



FIGURE 185. Instruction at Malaria Control School, 8th Medical Laboratory, Australia, 1943. A. Didactic classroom instruction. B. Collecting larvae in field.



FIGURE 185. Continued. C. Demonstration DDT spraying. D. Laboratory work.

the effort devoted to malaria played a major part in enabling the U.S. Army to perform its role in winning the war in the Southwest Pacific.

Lieutenant Bang, in addition to the photofluorometric studies just mentioned, carried out other studies of fundamental significance.

The Australians, under the direction of Brigadier Fairley, set up elaborate clinical experiments at Cairns in northern Australia. When a malaria commission consisting of Dr. Fred C. Bishopp and Dr. Robert B. Watson visited the area in July 1944 and were invited by Brigadier Fairley to visit this research unit at Allied Land Forces Headquarters, Colonel Thomas was allowed to accompany them. New Guinea mosquitoes were used to transmit New Guinea strains of *Plasmodium* to volunteer Australian soldiers. The good and bad points of treatment of malaria with quinine and Atabrine and of its suppression by these drugs were clearly defined, and Atabrine was finally adopted as preferable. Other interesting observations were also made at Cairns.

One of many studies on malaria suppression conducted independently in U.S. Army hospitals was carried out in a general hospital then stationed in Australia. A group of 10 officers took large doses of Atabrine and submitted to daily examinations of the optic fundi for expected signs of changes in the optic nerves. No such changes occurred, but 1 serious and 4 mild psychoses developed among the volunteers. Since toxic reactions to Atabrine were seldom encountered, except for occasional men who suffered from vomiting and unfortunately influenced psychologically susceptible companions to follow suit, it was concluded that these volunteers had become confused and then, in error, had taken excessive doses.

Toxic delirium from Atabrine, although it was occasionally observed, must have been extremely uncommon. At one general hospital, Major Harvey, chief of a section of the medical service, detected and described a group of patients who presented peripheral neuritis, which is a little-known complication of malaria. The association of atypical lichen planus with malarial suppressive therapy by Atabrine is described elsewhere (p. 549).

More studies would have been carried out if the two photofluorometers in the area had been released, as requested, to the general hospitals which had arranged for their requisition. On 27 February 1944, Colonel Thomas made the following (summarized) observations to the Chief Surgeon, USASOS, on malaria:

1. Many questions relating to suppression, treatment, cure, and immunity in malaria remain unanswered. The Office of the Surgeon General recognizes that many of them can best be sought when large groups of nonimmune soldiers enter highly malarious areas. Malariologists trained in special branches of malaria research have therefore been sent to the theater, and requests have been made for observations on particular phases of the disease.

2. It is recommended that one or more hospitals situated in highly malarious areas in which environmental malaria control measures have only recently been initiated should be designated for the hospital study of malaria.

Major Harvey, of the 118th General Hospital, is suggested as an officer well suited to supervise such a study because of his thorough training in clinical medicine and his brilliant record as a research worker in pharmacological and physiological subjects. Lieutenant Bang, is suggested as a part-time or full-time laboratory consultant to the group of workers proposed, and Lt. Col. (later Col.) Gottlieb L. Orth, MC, is suggested as consultant in problems dealing with infection, suppression, and mosquito control. A small number of technical laboratory personnel will also be required.

3. It was also recommended that a training center be established, in connection with all training of divisions which had been extensively exposed to mosquitoes infected with malaria parasites, for the purpose of rehabilitation and further study of soldiers experiencing primary or recurrent attacks of malaria. Followup studies can be made by the medical officers attached to these centers.

4. The last recommendation in this letter was that frequent and rapid correspondence concerned solely with professional matters be carried on with appropriate officers on duty in the Office of the Surgeon General.

This recommendation was included in an effort to open up direct communications between specialists working in the United States on all the problems involved in malaria and their opposite numbers in the SWPA. Such communication was forbidden for military reasons, and only routine monthly medical reports and similar correspondence were permitted. This restriction was a real handicap in the management of malaria, and it was responsible for some of the delay in establishing a satisfactory Atabrine regimen. Interchange of information by airmail would have been most helpful in this and in other medical fields.

So far as is known, there was no direct action on any of these recommendations.

DYSENTERY

Dysentery was never a major problem in the U.S. Army while it was in New Guinea or the Philippines. Through the foresight of Brigadier Fairley, the Australian authority on tropical diseases, Australian troops were provided with an ample supply of sulfaguanidine, which was most effective in suppressing dysentery. On the basis of this experience, the U.S. Army stockpiled large quantities of this drug, and, with its use and careful sanitation, the condition was usually under control.

There were occasional breaks in sanitary technique, usually when one unit moved away from a location in a hurry and failed to observe adequate precautions in the final 2 or 3 days in the area. Then, when another unit moved into the same area, outbreaks of dysentery were apt to occur before the area could be satisfactorily policed. Credit for the fact that so little trouble was encountered from dysentery in SWPA belongs directly to the routine sanitary measures insisted upon by the Army Medical Department.

In October 1943, when the hot weather became even hotter, a few cases of dysentery were observed in Base A. In Base D, while diarrhea diminished slightly, the number of cases of Shiga dysentery increased relatively, and one fatality occurred, after the patient was admitted to the 116th Station Hospital. *Shigella dysenteriae* (Shiga) was recovered from most patients, and treatment with large doses of sulfaguanidine usually brought about recovery.

Because Colonel Thomas had been greatly impressed by the therapeutic effect of intravenous sulfadiazine in the treatment of another infection, meningococcal meningitis, he was anxious to test the effect of this drug in severe cases of bacillary dysentery, and chiefs of medical services in various appropriately placed station hospitals were requested to try it. In the only suitable case found, an immediate curative effect was observed.

DENGUE

Dengue was widespread in a number of areas in New Guinea. Since this disease is transmitted by *Aedes aegypti*, which is not affected by measures commonly used to reduce or eliminate malarial mosquitoes, nothing much could be done except to give the patients symptomatic care. Although some characteristic breakbone fever cases were observed, with the typical secondary rise in temperature and extremely severe headache, most attacks were mild. The short duration of the attack and the absence of severe sequelae prevented dengue from being an important medical factor in New Guinea. This statement might not be concurred in by General Denit, who suffered one of the most severe attacks of the disease which occurred in SWPA.

SCRUB TYPHUS

One of the most dramatic diseases encountered in SWPA was scrub typhus (tsutsugamushi fever). Small, scattered outbreaks developed steadily as the fighting progressed throughout New Guinea. A very virulent outbreak occurred on Goodenough Island, where the Sixth U.S. Army had set up headquarters in November 1944, and another very large one occurred on Owi, in July and August 1944 (fig. 186).

Personnel of the 9th General Hospital had cleared an area on Goodenough Island, and, with some help from engineers, they had erected their own buildings. They worked in fields covered by kunai grass which, though it was unknown at the time, harbored the rodents (fig. 187) and the deadly little mites that transmit scrub typhus. Some 30 or 40 cases developed among the personnel of this hospital, and there were a number of fatal cases, one in a medical officer.

At the time this outbreak occurred, treatment was symptomatic, and the precise pathological lesions and deranged physiological functions were not known or understood. Later, as post mortem material was collected and it became evident that the widespread involvement of the capillary blood vessels produced lesions in all organs of the body, the signs and symptoms were more



FIGURE 186. Lt. Gen. Walter Krueger's Sixth U.S. Army Headquarters, Goodenough Island, December 1943.

understandable. Early in the experience with this disease, patients were seen to die from heart failure or from shock, with varying degrees of cyanosis and of moisture in the lungs.

Ways and means of using oxygen, digitalis, and infusions of plasma or salt solution were widely discussed and variously employed. The dangers inherent in all these methods were very real and occasionally apparent. In Colonel Thomas' opinion, the outcome in each case depended upon the virulence of the micro-organism present in the particular location rather than on the particular form of nonspecific therapy employed. In the large outbreak on Owi, the case fatality rate was 0.6 percent, but in the Goodenough Island outbreak and in another in the Finschhafen area, it was 35 percent.

Early accounts of the extensive but mild outbreak on Owi were reported casually because of the greater seriousness of the disease as it was experienced elsewhere and the vigorous and time-consuming measures which had to be taken against it. When sick reports from the task force under Maj. Gen. Horace H. Fuller, which was having a particularly difficult time dislodging the Japanese from caves along the coastal cliffs and hills of Biak (northwest of New Guinea), began to show alarming numbers of cases of scrub typhus, the Chief, Professional Services, USASOS, sent a radiogram under the signature of the Commanding General, USAFFE, to the Sixth U.S. Army offering medical officers, nurses, and supplies. On 2 August 1944, under the signature of Lt. Gen. Walter Krueger, it was stated that only one medical officer was necessary at the time and Colonel Thomas was requested.



FIGURE 187. Bandicoot rat, host of mites transmitting scrub typhus.

This incident typified the unfortunate lack of understanding between the Office of the Chief Surgeon, USASOS, and the Sixth U.S. Army Medical Section. The offer of medical officers, nurses, and supplies was, in fact, impractical. On Owi, excess medical officers would have been a nuisance, and there was no place for nurses to live, even if safe transportation had been available. As for supplies, they became adequate as soon as they could replace essential ammunition on cargo aircraft. Colonel Hagins, however, could readily have used a medical officer to serve as one of his own staff, to keep him informed of the situation, and to make suggestions to him.

On the night the radiogram from the Sixth U.S. Army was received, Colonel Thomas boarded a plane, carrying his musette bag and a cage containing 24 white mice. Early or doubtful diagnoses of scrub typhus were to be proved by inoculation of these laboratory animals.

As already mentioned, this large outbreak was associated with the unprecedentedly low case fatality rate of only 0.6 percent. The fright among line officers resulting from it, however, hastened cooperation in measures of prevention. Scrub growth was rapidly cleared and mite repellent freely used (fig. 188). Steps were taken to obtain impregnated clothing for future operations in the same type of terrain.

A number of useful lessons were learned from this mild outbreak. Another medical officer continued the study which Colonel Thomas had begun, and he prepared an account of the clinical picture and the distribution of cases among the troops assigned to the task force.

Special investigations.—The group sent from the United States of America Typhus Commission to New Guinea to study scrub typhus was headed by Dr. Blake and Dr. Maxcy and included entomologists, parasitologists, and well-trained laboratory personnel (fig. 189). Preparations for their arrival included the setting up of laboratories in new portable buildings in conjunction



FIGURE 188. Scrub typhus control, 360th Station Hospital, Goodenough Island, January 1944. A. Natives cutting and gathering kunai grass for burning. B. Cleared area after sand and gravel were spread; burning kunai grass continues in rear.

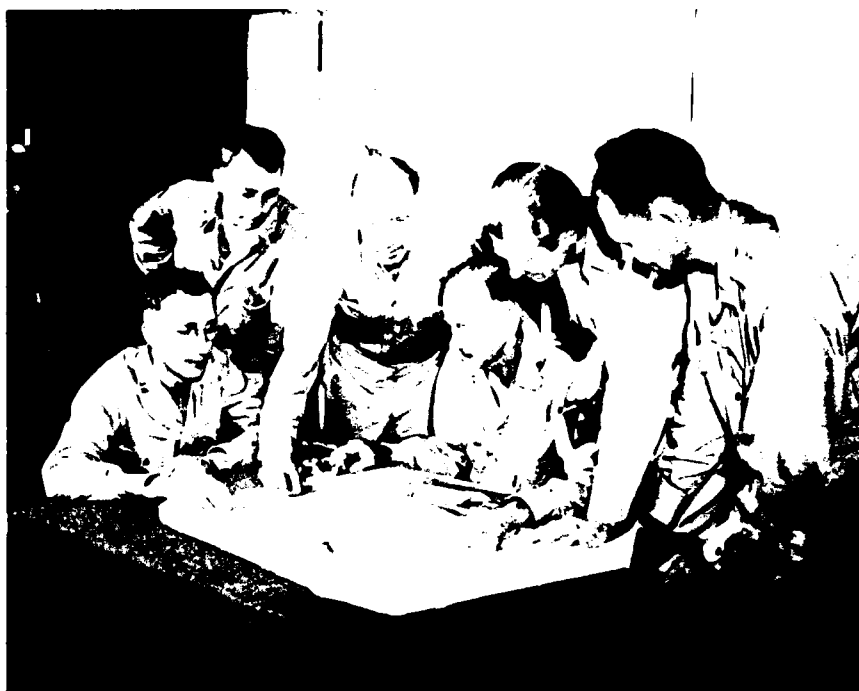


FIGURE 189. Members of U.S.A. Typhus Commission in New Guinea. 3d Medical Laboratory, Oro Bay, New Guinea, December 1943. Left to right, Capt. Glenn Kohls, entomologist; 1st Lt. John Bell, SnC, from Rocky Mountain Laboratory; Dr. Kenneth F. Maxey, epidemiologist; Dr. Francis G. Blake, technical director; Lt. Col. Joseph F. Sadusk, Jr., commanding officer of commission; and Col. Francis E. Council, commanding officer, 3d Medical Laboratory.

with a station hospital in Dobodura, an area in which scrub typhus had been prevalent (fig. 190). Here the disease was studied, the location and transmission of the mites were determined, new forms of mites were described, and, finally, methods for the prevention of typhus were elaborated and clearly described (fig. 191).

Technical Memorandum No. 9, published by the Office of the Chief Surgeon, Headquarters, USAFFE, 6 August 1944, included a brief description of the disease, detailed explanations of the vector and reservoir hosts, and instructions for control and prevention. The subject had been previously dealt with in Circular No. 117, Office of the Chief Surgeon, Headquarters, USAFFE, 31 December 1943; War Department Technical Bulletin (TB MED) 31, 11 April 1944; and an article in the *Bulletin of the U.S. Army Medical Department* in May 1944.³

Impregnation of clothing. Circular No. 117, just mentioned, contained the following (summarized) information on the impregnation of clothing and blankets with methyl phthalate emulsion:

Experience with mass impregnation of clothing with a soap emulsion of methyl phthalate has been acquired in recent field tests with troops and as a

³Scrub Typhus. Bull. U.S. Army M. Dept. No. 76, May 1944, pp. 52-61.

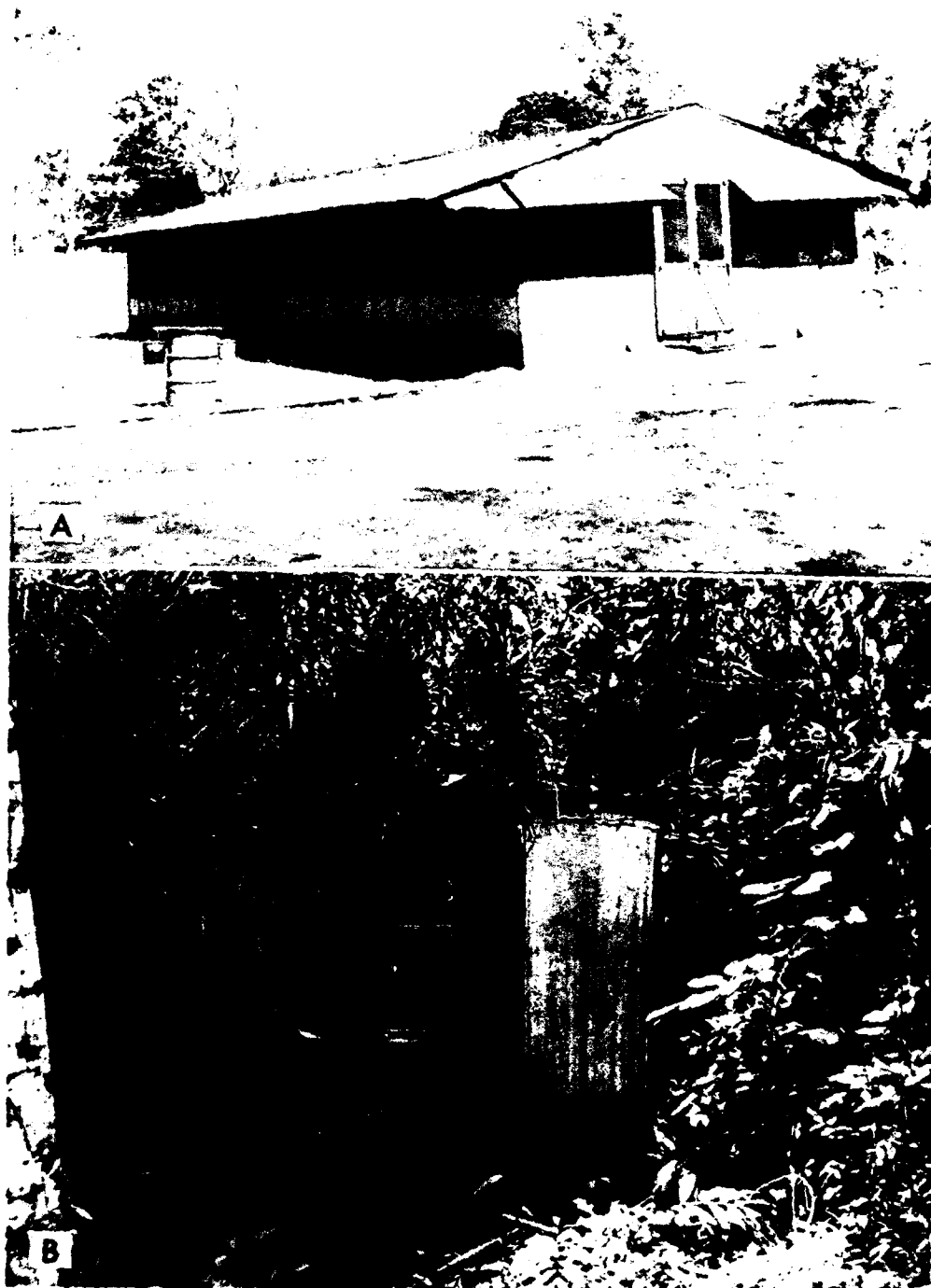


FIGURE 190. Facilities of U.S.A. Typhus Commission. A. Laboratory building.
B. Insectory.



FIGURE 191. Testing mite repellents. A. Method of rearing mites. B. Testing repellents in the field.

control measure in a recent outbreak. As a result of these experiences, it is recommended that this method be used in all troops *before their participation in combat* or in combat training. In both circumstances, it is considered to offer the best protection available at this time. Engineer troops working in suspected areas and staging troops among whom typhus has appeared should also have the added protection of this measure.

Methyl phthalate in 1-gallon tins is now being received in this theater for clothing impregnation. The issue is on the basis of 10 ounces per man per month. Issue is restricted to troops designated for duties which will involve exposure as just described (fig. 192). Requisitions should be accompanied by details of the circumstances which render the use of this agent advisable.

It was something of a triumph to persuade the fighting man to adopt and carry out the painstaking measures which prevented scrub typhus (fig. 193). The complete story entails the pioneer work accomplished by the Australians; extensive research by the group from the United States of America Typhus Commission as well as by others; overcoming Sixth U.S. Army objections to the time-consuming and complicated control measures; and, finally, the mass impregnation of clothing by Army laundries. The story of prevention and control is told in detail in the preventive medicine volumes of the history of the U.S. Army Medical Department in World War II.

Rehabilitation and disposition.—Patients recovering from scrub typhus were found to present a real problem in rehabilitation. The disease had acquired a fearsome reputation, and convalescent patients, as well as many medical officers, were frequently convinced that they had suffered some permanent damage to the heart or other vital organs.

Technical Memorandum No. 10, published by the Office of the Chief Surgeon, Headquarters, USAFFE, 29 August 1944, advised a carefully supervised program of physical reconditioning for these patients, combined with reassurance as to their ultimate recovery, as follows:

Reassurance may be soundly based on the careful studies carried out in this area on large series of convalescent patients in whom the physical signs, the X-ray findings, the electrocardiograms, the vital capacities, and the exercise tolerance tests were critically evaluated to determine the frequency of residual cardiovascular damage. The results of these studies indicated that there is no evidence of permanent organic damage and that functional neurocirculatory symptoms were no more frequent than they are after other severe febrile illnesses. It may be concluded that, though vascular and perivascular lesions occur in the heart as well as in the lungs, brain, and other tissues during the active stage of the disease, the recovery from these inflammatory processes is complete, with very occasional exceptions. When permanent disability persists, as it does in these very occasional cases, it takes the form of varying degrees of deafness, diminished vision, involvement of the peripheral nerves, or other residual damage, chiefly of the nervous system.



FIGURE 192. Troops of 1st Cavalry Division impregnating their clothing, Los Negros Island, Admiralty Group, October 1944.

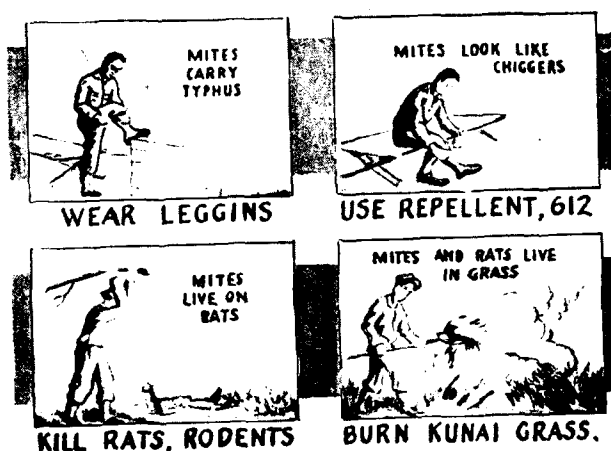
Recommendations for disposition consisted of grouping the patients as follows:

1. The first group consists of patients in whom the course of the disease has been sufficiently mild to warrant the estimate that they will be in condition to return to general service at some time within 6 weeks after admission to the hospital. They should spend their convalescence in the convalescent section of the hospital or be transferred to a convalescent hospital within the same base. Careful medical supervision should be maintained over their progress through a graded schedule of exercise, recreational activities, and other measures of physical and mental upbuilding.

2. The second group consists of patients whose course has been of medium severity and who would require at least a month of reconditioning after hospital treatment was no longer necessary before assignment to duty. Such patients should be transferred to a general hospital or a designated station hospital to be recommended, as soon as their condition permits, by a disposition board, for transfer to the First Training Center, Replacement Command, Oro Bay. Officers below the grade of lieutenant colonel as well as enlisted men should be so recommended for disposition.

Hospital patients transferred to the First Training Center should be able to care for themselves without nursing attention and to perform light camp

SCRUB TYPHUS *is in* YOUR AREA



Prevention is the best and only cure!

6TH MALARIA SURVEY UNIT

FIGURE 193. Poster urging preventive measures against scrub typhus.

duties. It was desired that full advantage be taken of the resources of this center for the reconditioning of all long-term patients no longer requiring hospital care but not yet fit for return to their former assignment. The center provided a graded schedule of physical activities under medical supervision, a hospital scale of rations, and recreational and educational features. Training was carried on in an environment of military discipline until the convalescent was determined to be fit for reassignment.

Careful judgment had to be exercised to be sure that patients who could not be expected to perform any militarily useful service, even after rehabilitation, were promptly evacuated to the United States.

3. The third group of convalescents from scrub typhus fever consists of those who because of the extreme severity of their illness or the development of complications would plainly be unfit for military service within a period of 120 days, counted from the day of their admission to the hospital. These patients were to be transferred to a general or designated station hospital, to be evacuated to the United States on the recommendations of a disposition board.

DIFFERENTIAL DIAGNOSIS OF ACUTE FEVERS

Mild attacks of dengue were diagnosable only by the association of the patients with patients who were suffering more severe attacks. The same was true of mild attacks of many other febrile diseases encountered in New Guinea. The diagnostic difficulties, in fact, were such that the medical services in many station hospitals began to enter large numbers of cases as "fever of undetermined origin" (FUO). At one time, there were so many such diagnoses that Colonel Thomas was instructed by the Office of the Chief Surgeon, Headquarters, USASOS, to investigate the matter. In every case which he observed, the diagnosis was in real doubt, though occasionally there was a fairly well founded suspicion that the disease lay in one or another special category. In his opinion, very few of these cases represented mild breakthrough attacks of malaria.

In view of the importance of accurate classification of disease, both for proper treatment and statistical purposes, Colonel Thomas prepared the following (summarized) material on the differential diagnosis of acute fevers, which was published as Technical Memorandum No. 7, Office of the Chief Surgeon, Headquarters, USASOS, 21 March 1944:

Malaria. A positive smear should be obtained in as many cases of malaria as possible. If the first smear is negative, additional smears should be taken at daily intervals. If the general condition is good, it is proper to *withhold treatment for several days in the effort to get a positive smear*, but, whenever this is done, the patient must be watched very closely; in primary falciparum infections, although parasites may be very scanty in the peripheral blood, he may pass into a serious condition within a few hours.

The desirability of getting a positive smear before antimalarial treatment is begun must not prevent treatment in any patient who presents symptoms strongly suggestive of malaria, particularly a tertian fever. Such cases should be reported as "malaria, clinical diagnosis." Symptoms of cerebral malaria demand prompt treatment, irrespective of what the smear shows.

Withholding suppressive Atabrine for 2 or 3 days in an effort to get a positive smear is likely to be ineffective. Withholding the drug for a longer period is unjustified.

When patients are treated on the presumption of malaria without a positive smear and the temperature does not remain normal after 48 hours of treatment, another cause for the fever should be seriously considered. Some patients with malaria will run a fever for 3 or more days, it is true, but they constitute only a small group.

Dengue. This protean disease is characterized by 5 to 7 days of fever, either so-called saddleback or continuous; headache; retro-orbital pain; conjunctival suffusion; backache and periarticular muscular pains; and a rash, which usually appears on the fourth to the sixth day. While there is considerable variation in the severity of symptoms and duration of fever, the diagnosis of dengue when the temperature elevation lasts less than 4 days

should be viewed with suspicion. Very mild, afebrile cases of dengue probably do occur, but the differentiation of them from other short fevers is not reliable.

Upper respiratory diseases.—Common nasopharyngitis, sinusitis, tonsillitis, and bronchitis are usually readily distinguished as such if the examination is adequate. Fever may persist for several days. Upper respiratory symptoms are usually minimal in dengue. At this time (March 1944), influenza had not yet been recognized in the forward area.

Diarrheal diseases.—Diarrheal diseases are usually readily recognized. Fever is frequently associated with diarrhea and usually associated with dysentery, but diarrhea also occurs in malaria, dengue, and typhus. In the diarrheal diseases, fever and diarrhea either begin together, or the diarrhea precedes, rather than follows, the onset of fever. The degree and duration of the fever may be out of proportion to the number of bowel movements.

Effects of heat.—Certain persons, particularly if unseasoned to hot weather, may develop fever, headache, abdominal cramps, and muscular pains after working in the heat. The picture observed in New Guinea, however, frequently does not correspond with textbook descriptions of heatstrokes, heat exhaustion, or heat cramps from loss of salt. Diagnosis should not be difficult when the history shows a definite relation between the onset of symptoms and heavy work in a hot atmosphere and when the response to rest and the administration of salt is prompt.

Typhus.—Typhus may be difficult to diagnose in the first few days of the illness. The onset is likely to be more gradual than in dengue, with the fever rising gradually for the first 2 or 3 days and then persisting for 10 to 14 days or even longer.

Helpful points in diagnosis include the presence of an eschar, which can be found on careful search in most cases; adenopathy, particularly if it increases over a period of a few days; and the rash. Confirmatory evidence is obtained by agglutination with *Proteus* OXK, which is usually present by the 10th day and which reaches a maximum 2 or 3 days after the temperature has returned to normal. A titer of 1:80 is considered suspicious, and a titer of 1:160 or greater is usually considered diagnostic. The diagnosis of typhus when the fever lasts less than 10 days is seldom justified, and the same holds for cases in which the fever lasts longer but there is no eschar and the OXK agglutination is negative.

Enteric fevers.—Only a few cases of the enteric fevers (typhoid and Salmonella) have occurred up to this time, but these diseases must nonetheless be borne in mind. They are to be distinguished from typhus by the absence of an eschar; the differences in the skin rashes; the negative *Proteus* OXK agglutination; the increasing titer in the Widal test; and positive blood, stool urine cultures.

FUO.—The differential diagnosis of many of the fevers mentioned cannot be made on admission. In cases of short duration, the diagnosis is often best made when the patient is discharged, when the clinical course, the symptoms, and the character of the temperature curve can be carefully reviewed. Even

then, a critical clinical appraisal may still not make it possible to place the case in any particular category.

Cases of this kind may be recorded as FUO. Even under adverse conditions, however, the number of cases thus diagnosed should not constitute more than 10 to 20 percent of all febrile admissions.

INFECTIOUS HEPATITIS

Infectious hepatitis began to be a problem in the spring of 1944, with the development of isolated cases in areas far removed from each other and with no apparent method of spread.

The first large group of cases which might be described as epidemic occurred in the task force which invaded the neighboring islands of Biak and Owi, areas in which a scrub typhus epidemic had occurred. Although a few cases of hepatitis developed before the first case of scrub typhus was observed, from then on, the two outbreaks paralleled one another until the scrub typhus was controlled by eliminating the mites, which was accomplished by clearing away scrub growth and tall kunai grass, and by impregnating clothing with methyl phthalate. In July, August, and September 1944, the outbreak of infectious hepatitis assumed notable proportions.

The invasion of Leyte took place just after the height of the outbreak on Owi, and all the hospitals in the Leyte area received a great many patients suffering from hepatitis.

Clinical and Epidemiological Studies

With the concurrence of Colonel Hagins, Sixth U.S. Army Surgeon, the outbreak of hepatitis in Biak and Owi was studied by Maj. James L. Borland, MC, gastroenterologist from the 105th General Hospital, and Lt. Col. (later Col.) William B. Vandergrift, MC, Chief, Laboratory Service, 118th General Hospital. They spent about 6 weeks in August and September 1944, collecting information, observing patients, and making exhaustive laboratory tests. They also attempted to cultivate a virus. Their preliminary reports, which included all the data available, were sent to the Surgeon, Sixth U.S. Army, in October and November, and their final report was sent to the Chief Surgeon, USASOS, 18 December 1944.

While in Brisbane, Colonel Thomas prepared material for the area ETMD (Essential Technical Medical Data) and also wrote Technical Memorandum No. 16, which was published on 1 October 1944 by the Office of the Chief Surgeon, Headquarters, USAFFE. The data on infectious hepatitis contained in these various reports and other publications may be summarized as follows:

Historical note. Outbreaks of jaundice have been reported for at least 100 years and have been particularly numerous in armies in wartime. Over 52,000 cases were reported in the Union Army during the Civil War in the course of 3 years. Outbreaks have occurred in World War II in British troops in the Middle East and among U.S. troops in North Africa and practically all other areas.

Epidemiology.—Opportunity for study has led to increased knowledge of this disease in recent years. It is now believed that the etiologic agent is a filterable virus or group of viruses, although attempts to cultivate it (or them) have been unsuccessful.

The disease has been passed from patients to volunteers by several methods, including nasal insufflation and intracutaneous inoculation of serum and whole blood. More recently, filtered excreta have been shown to contain the virus and have produced the disease upon ingestion by volunteers. This observation has introduced an important concept concerning the possible transmission of the disease by contaminated water or food.

The special epidemiologic studies in the investigation, just referred to, of the outbreak on Biak and Owi revealed no common water points, swimming areas, or messes. The affected units were not in closely adjacent areas and had no common meeting places except occasionally at open-air motion pictures. There were no common prior staging areas. The only Navy personnel who developed the disease had been ashore in the involved area. It was concluded that the virus had probably been brought in by U.S. soldiers and sailors and that the variety of spread pointed to a vector. The common fly and a species of *Phlebotomus* were suspected, especially the latter. The incubation period was between 3 and 5 weeks and was most often 4 weeks.

Clinical picture.—When infectious hepatitis occurred in outbreaks, the clinical picture followed a definite and characteristic pattern. The onset in the majority of cases was characterized by fever, often followed by a latent period during which the patient might feel perfectly well. The onset might also occasionally be characterized by a chill, headache, and general malaise. Then would come an acute phase, from the fifth to the seventh day, ushered in by anorexia, nausea, sometimes vomiting, weakness, and pain in the upper abdomen. Jaundice ensued, associated with an enlarged and tender liver in about two-thirds of all cases and, occasionally, an enlargement of the spleen. About a third of the patients had a slight temperature elevation at this stage.

About a third of all the patients observed had no history of a preliminary febrile stage and became aware of the disease only when they noticed yellow scleras or dark-brown urine, usually associated with a distaste for food and slight lassitude.

In from 1 to 5 weeks, the jaundice began to clear, and recovery was usually rapid, lasting not more than a month. The mildness of the illness and the length of convalescence were thought to be directly proportional to the amount of rest. Patients kept in bed on Owi until the jaundice finally cleared practically all did well. The only fatalities and complications occurred in patients who were evacuated. It was thought that return to duty before the jaundice had fully cleared predisposed to relapse and prolonged the convalescence.

In the occasional fatal case, a sudden lapse into delirious semicomatose took place 4 to 10 days before death occurred from acute yellow atrophy of the liver.

In December 1944, Colonel Thomas observed two patients on Leyte who died of jaundice with unusual findings. Both died suddenly and unexpectedly after they had been jaundiced for 5 days before admission and 2 or 3 days in the hospital. Neither had fever, and neither was apparently very ill. Clinically the cause of death was acute pulmonary edema. In both cases, autopsy showed that all five lobes of the lungs were totally involved in an early bloody pneumonia. The trachea and bronchi were pale and did not contain pus. One patient had hemorrhages throughout the kidneys and in the interventricular septum, suggesting a sudden cardiac death, but these findings were not present in the second case. No pathogens (plague bacilli) were present in smears from the lungs, but inclusion bodies—a weak reed to lean on—were suspected. The liver in each instance showed minimal uniform cloudy swelling.

Diagnosis.—During the outbreak of infectious hepatitis, it was possible to suspect the correct diagnosis during the early febrile stage. Confirmation was obtained by observation of bile in the urine several days before jaundice became evident.

No instance of Weil's disease (infectious hepatitis caused by *Leptospira icterohaemorrhagiae*) was found in these outbreaks. The organism, however, was isolated from three natives of New Guinea by a U.S. medical officer. In each instance, the clinical picture was typical of Weil's disease, and all the patients responded promptly to treatment with penicillin.

Treatment.—Treatment of infectious hepatitis consisted chiefly of rest and diet. Rest in bed was enforced as soon as the condition was suspected, and unnecessary movement of the patients was strictly prohibited.

It was of major importance that a satisfactory state of nutrition be maintained. The diet was kept low in fat, but the addition of small amounts of milk, cream, or butter was permissible if the increased palatability thus obtained enabled the patient to eat more food. Polyvitamin capsules were administered twice a day.

Fluids were taken freely. If vomiting interfered with an adequate intake, 5-percent glucose in physiological salt solution was injected intravenously in amounts sufficient to produce a daily output of 1,200 cc. of urine. Plasma was of possible value in the presence of ascites, but this complication was both late and unusual.

When the hospitals on Leyte began to receive patients with infectious hepatitis, wounded soldiers required major attention, and many of the patients with hepatitis, who were less seriously ill, were transferred rapidly to a large convalescent hospital, long before their jaundice had cleared up and in some instances even before it had begun to lessen. In this hospital, the patients were forced to walk long distances to and from meals. They had absolutely no nursing care and even had to take care of their own beds.

It was interesting to Colonel Thomas and others, who were watching this situation with some misgivings, to note that these patients went on to complete recovery and that very few developed serious complications. In only a few cases did the disease progress to the chronic stage. The final word

on these cases could, of course, come only from followup studies, which were not practical.

While he was on Leyte, Colonel Thomas received some of the voluminous reports on studies of hepatitis in the Mediterranean theater. The military situation on Leyte prevented following any of the recommendations contained in these reports, and the cases just described therefore may be considered to have served as a rather interesting control series.

Control.—Recommendations for control of infectious hepatitis, Colonel Thomas pointed out in his October 1944 report, were difficult to make in the present state of knowledge. It was thought that transmission might be by droplet infection, but attempts had also been made to incriminate an insect vector. On the other hand, demonstration of the infecting agent in the stool, and possibly in the urine, of patients with the disease suggested the prime importance of methods designed to prevent contamination of water and food. The following recommendations were therefore made:

1. All the usual sanitary measures should be strictly enforced.
2. Bathing in fresh-water streams should be prohibited.
3. Hospitals should institute the isolation measures used in typhoid fever, with proper disinfection and disposal of patients' excreta. Nurses and ward attendants should wash their hands thoroughly after every contact with a patient or his excreta. This recommendation was most important, for several nurses had contracted the disease in hospitals in which these patients had been cared for.
4. Since the duration of infectivity was unknown, patients should be instructed to observe special measures of cleanliness during convalescence, to avoid possible contamination from their excreta.

AMEBIASIS

In June 1945, Colonel Thomas paid a short return visit to Leyte with the double object of facilitating the work of the subcommission and other groups studying schistosomiasis and of setting up a study throughout the base on amebiasis, with particular reference to its prevalence and the correctness of diagnosis and treatment in the various hospitals.

The amebiasis program was accomplished by arrangements with the base area surgeon to have Col. James Bordley III, MC, Commanding Officer, 118th General Hospital, instructed to make a survey and submit a report on this disease. In addition to factfinding, Colonel Bordley, in the course of his investigation, was able to disseminate a great deal of useful information and to institute valuable clinical and followup studies.

Essential Facts of the Disease

The following facts are taken from a lecture on the subject which Colonel Bordley gave at the Office of the Surgeon, Base K, 25 June 1945:

Incidence and epidemiology.—An increasing incidence of amebiasis has been reported in Base K among hospital patients, including not only cyst

carriers but patients with active amebic dysentery. This increase may be due in part to greater awareness of the disease and better diagnostic study of all patients with diarrhea or abdominal complaints. Cases which formerly escaped attention have unquestionably been brought to light by (1) multiple stool examinations and rectal smears, (2) more frequent use of the sigmoidoscope, and (3) more frequent surveys of foodhandlers. The incidence of amebic dysentery is relatively, though not alarmingly, high at this time.

As far as can be determined from recent stool surveys of the civilian population made by malaria units on Leyte, the cyst carrier rate is somewhere between 5 and 10 percent, no higher than might be found in certain sections of the United States. Possibly these figures are too low, since the surveys were not made with particular attention to amebiasis. There does, however, appear to be an alarmingly high carrier rate among civilians, though nothing approaching the high rates reported for *Schistosoma* eggs and *Ascaris*.

If the amebic dysentery rate is high (in troops) and the cyst carrier rate is low (in civilians), then there may be some special explanation for the dysentery. It is known that in experimental amebic infections in animals, dietary and other factors may play an important role. According to Faust, there is no evidence to indicate that the amebic organisms in a community may suddenly become more virulent. It would therefore seem that a high carrier rate (in the Army) associated with a relatively low carrier rate (in the population) must probably be explained by factors other than the virulence of the organism. Among these factors may be:

1. Decreased host resistance due to combat conditions and injuries and specific debilitating diseases prevalent here, particularly infectious hepatitis and schistosomiasis. A 34-year-old sergeant, for instance, was admitted to the 118th General Hospital, 2 January 1945, 48 hours after the onset of chills and fever. He was jaundiced and had an enlarged, tender liver and an enlarged spleen. On the third day of his illness he developed abdominal pain and diarrhea, which were thought to be part of the symptomatology of acute infectious hepatitis. He died on the 10th day of hospitalization, after a stormy illness. At autopsy, he presented what would be interpreted as an extraordinary example of reduced host resistance to *E. histolytica*. There was an enormous swelling, with extensive ulceration, of the wall of the colon, all layers of which were heavily infiltrated with the organisms, which had also infiltrated the walls of the small mesenteric arteries and veins, with resultant thromboses, and were also present in the regional lymph nodes. The liver was studded with small necrotic and hemorrhagic foci containing amebas.

2. A large infecting dose. There was certainly ample opportunity for very considerable contamination of drinking water during the early days on Leyte. Because of the shortage of potable water, shallow wells were dug hurriedly in populated areas, and there was great difficulty in keeping them from becoming contaminated by surface water during the heavy November and December rains. The experience of the 133d General Hospital was typical of the results of these conditions. This unit arrived soon after the landing and

began to establish itself in a populated area on the highway on the southern edge of the village of Palo. Personnel had constant contact with muddy ground that had been the repository of the feces of the displaced populace. The native laborers doubtless contributed further to the contamination during the early period of hospital construction. Flies were all about. Meals were prepared and served in open, unscreened tents. Water came from 10-foot wells dug in low ground, where the ground-water level was only 2 or 3 feet below the surface. Amebic cysts were actually found in a sample of water from one of these wells. The report is perfectly credible, since none of the native huts removed from the area or still surrounding it had any sort of latrine. The well could easily have been dug through earth which had once been an informal latrine for a native family.

It is not surprising that the incidence of dysentery was very high among the original personnel of this hospital. It was extremely difficult for them to staff their kitchens and messhalls because a survey of their foodhandlers showed that 23 were amebic carriers.

A stool survey was made of two groups of the personnel of the 133d General Hospital by Maj. (later Lt. Col.) Irving J. Glassberg, MC, of the hospital laboratory. In the first group were approximately 200 officers and men of the original contingent which had been so heavily exposed; stools were positive for *E. histolytica* or trophozoites in approximately 37 percent. In the second group were approximately 150 nurses and enlisted men who had come from the United States to join the unit about 3 months before the survey was undertaken. In them, the incidence of *E. histolytica* was less than 2 percent.

Conditions at this hospital were subsequently improved. Natives were moved from the immediate area. Water was piped in from the mains of the Palo municipal water system. Messhalls and kitchens were adequately screened and flies reduced to a minimum. Tent floors and raised walks, finally, kept the personnel out of the mud.

Base K served as a hospital center for both combat and garrison troops on other islands and received large numbers of patients from Mindanao, Mindoro, Cebu, Negros, Luzon, New Guinea, Palau, and other islands, on which the carrier rate was unknown. The sanitary conditions on some of the more recently occupied islands were still much as they were on Leyte during November and December. Many of the patients hospitalized at the 116th Station Hospital were members of a combat division said to have acquired their infections in Palau.

Diagnosis.—As was generally suspected, the most recent survey of hospitals showed a wide divergence of understanding about the reporting of amebiasis. In conformity with Army Regulation (AR) 40-1025 (12 December 1944), there were three choices: (1) dysentery, amebic; (2) amebic infection, nonintestinal location; and (3) *E. histolytica* carrier.

The survey disclosed that earlier a number of cases had been reported as amebic dysentery instead of amebic infection. Over 900 patients were presently under treatment in hospitals for amebic infection, but there seemed to

be not more than 167 cases of amebic dysentery among them. A certain proportion of these patients undoubtedly had nonspecific diarrhea, and thorough stool examinations had disclosed a few amebic organisms.

The differentiation between true amebic dysentery and diarrhea in amebic carriers is not always easy. Furthermore, the accuracy of the diagnosis cannot always be determined by reviewing the case records because the clinical notes often are not sufficiently detailed. In questionable cases, the diagnosis of amebic dysentery can best be established by demonstrating the typical ulcers through the sigmoidoscope or by studying the character of the exudate (pus and blood) in the feces.

It is therefore strongly recommended that particular attention be paid to the character of the excreta and that sigmoidoscopic examinations be performed as often as necessary. If a patient with acute diarrhea does not have blood and pus in his feces and does not present demonstrable ulceration of the lower bowel, the primary diagnosis should be recorded as "diarrhea, causes undetermined, acute," and the secondary diagnosis as "*E. histolytica*, carrier."

It must, of course, be assumed that the specific bacterial dysenteries have been ruled out by culture of the stools before this diagnosis is made. The reports all seem to indicate a surprisingly low incidence of bacillary dysentery on Leyte. This is puzzling in view of the sanitary conditions which prevailed during the first several months after the landing. In November and early December 1944, many cases of acute diarrhea went unreported and were certainly not adequately studied. Among personnel of the 118th General Hospital, which established itself in November in an area not much better than that described for the 133d General Hospital, diarrhea was very common, but it was seldom accompanied by fever or constitutional symptoms. Most of the personnel accepted it and did not report sick. Many, during several nocturnal air raids, were personally faced with the decision whether to take the long, muddy walk to the latrine or to head for the slit trench. Yet there was no bacillary dysentery, at least of a clinically recognizable type, because of settling in an area of poor sanitation. Perhaps some of this good fortune was due to the fact that the sulfa drugs were handed out liberally to the personnel of most units.

Unlike bacillary dysentery, amebic dysentery does not make its clinical appearance during the early, poor-sanitation period of a campaign. This should be borne in mind in making the diagnosis. Owing to the long and variable incubation period, manifestations do not appear for weeks or months, whereas in bacillary dysentery, the incubation period is usually 2 to 7 days. In volunteers who were fed amebic cysts by Walker and Sellards, the incubation period varied between 20 and 100 days. The prevalence of amebic infections is therefore likely to become evident gradually and insidiously, as in the famous Chicago outbreak and as happened on Leyte. There was none of the explosiveness which characterizes outbreaks of bacillary dysentery.

Results of Survey

Colonel Bordley's final report contained a detailed survey of the various hospitals studied; an analysis of divergent methods of diagnosis, including the use of such devices as purges, sigmoidoscopes or proctoscopes, and an elongated glass eyedropper for collecting material for microscopic examination; techniques of treatment, including reported successes varying from 60 to 100 percent in ridding feces of cysts and trophozoites; and criteria for cure, disposition, and sanitary precautions.

The survey created a great deal of interest in the hospitals on Leyte and raised the standard of medical practice in this particular disease. Had the war lasted longer, the usefulness of the investigation would have been extended to other areas.

Colonel Thomas and Colonel Eppinger prepared a technical memorandum[†] on amebiasis which was issued on 21 November 1944.

DIPHTHERIA

On his way to Australia in October 1943, Colonel Thomas had stopped for a brief visit at the 18th General Hospital, then stationed in the Fijis. Col. Benjamin M. Baker, MC, Consultant in Medicine, SPA (South Pacific Area), gave him a full account of the prevalence of skin diphtheria in that area. Many of the early cases had been missed in the wards of the various hospitals scattered through these islands, but when medical officers were alerted to the possibility of the condition, many more cases were brought to light, and the diagnosis was confirmed by culture. When he arrived in Australia and later went to New Guinea, Colonel Thomas passed on this information, particularly to officers of dermatological wards in which cultures of suspicious lesions had been made.

The first active cases recognized in SWPA were observed on visits to Finschhafen and Hollandia in October 1944; there had been small outbreaks in each of these locations. Previously, cases of peripheral neuritis following skin ulcers or so-called jungle rot had been suspected but not proved to be caused by the toxin of the diphtheria bacillus.

The following (summarized) information was prepared for Technical Memorandum No. 17, issued by the Office of the Chief Surgeon, Headquarters, USAFFE, 23 October 1944, and was also included in a section prepared for ETMD's:

1. An increase in the number of reported cases of clinical diphtheria has recently occurred in SWPA. In one base, there has been a small outbreak of the disease in a virulent form involving the larynx and bronchi. The attention of medical officers is directed to these facts, so that individual cases may be promptly recognized.

2. In tropical areas, the diphtheria bacillus attacks the respiratory tract but also, not infrequently, attacks any ulcerative skin lesion or open wound.

[†] Technical Memorandum No. 20, Office of the Chief Surgeon, Headquarters, USAFFE, 21 Nov. 1944.

Its presence in such lesions may readily go undetected. In some instances, outbreaks of pharyngeal diphtheria have been traced to contact with cases of diphtheritic skin infection.

3. The frequent occurrence of peripheral nerve palsies and pharyngeal paralysis due to diphtheria has also been reported from another tropical area. In some instances, investigation of the cause of the motor nerve lesion has led to culture of the throat or of the base of skin ulcers which proved positive for virulent diphtheria bacilli. The possibility of this association should be borne in mind.

4. All patients with sore throats should have throat cultures taken when they are admitted to the hospital and should be isolated pending receipt of the laboratory report. All skin lesions or infected wounds with suspicious characteristics should also be cultured, and necessary isolation should be maintained until the laboratory report is received.

5. Throat cultures, nasopharyngeal cultures, and cultures from granulations at the base of ulcers or infected wounds should include routinely streaks on Löffler's media or other media selective for diphtheria bacilli, such as tryptasetelurite plates if they are available. Whenever necessary, hospital commanders should request the assistance of the nearest medical laboratory in the Army or the Communications Zones in establishing this technique. All positive cultures obtained in hospital laboratories should be forwarded to the nearest medical laboratory for control and for necessary virulence tests.

6. Hospital commanders should immediately report the occurrence of clinical diphtheria in their commands to the Base or Task Force Surgeon. The institution of measures to prevent the spread of the disease within the hospital and in other units of the command is the responsibility of the Base or Task Force Surgeon.

A few isolated cases of diphtheria were encountered in New Guinea and in the Philippine Islands, but the disease caused no further serious trouble.

POLIOMYELITIS

The first cases of poliomyelitis encountered in SWPA were observed on Leyte in November 1944. It was known that the disease is endemic in the Philippine Islands, and that it might assume a particularly deadly form in the U.S. population.

When the first cases occurred, it was thought that they might represent one of the more uncommon varieties of virus diseases, such as Japanese B disease or equine encephalomyelitis. For these reasons, on 20 November 1944, the Surgeon, Sixth U.S. Army, requested that a team be sent to Leyte, to study the outbreak. Colonel Thomas was dispatched with this team for the purpose of making clinical observations on these cases. Two virus bacteriologists, an epidemiologist, an entomologist, and four specially trained laboratory technicians departed from New Guinea, 25 November 1944, and arrived at Tacloban 48 hours later. All members of the team except Colonel Thomas

were personnel of the staff of the 19th Medical General Laboratory. A report was sent to the Chief Surgeon, USASOS, on 17 December 1944. The following (summarized) data are taken from it.

Incidence.—Between 13 November and 17 December 1944, 43 cases were observed in U.S. troops on Leyte, in personnel of Army and Marine Corps units scattered along the eastern coast from Tacloban down beyond Dulag to Abuyog. The cases were scattered throughout the task force, but no organization had more than one case except for a howitzer battalion of the Marine Corps, which had two cases. In 33 cases, there was residual paralysis. In the other 10 cases, the symptoms and signs consisted of headache, pain in the lumbar region, weakness, fever, and an increased spinal fluid cell count, but there was no residual paralysis.

When three of the first five patients died early in the acute stage of the disease from bulbar involvement and a fourth died after 3 weeks in a respirator, the virulence of the prevailing micro-organism could not be doubted. Subsequently, milder cases were observed. The mortality rate among troops previously staged in New Guinea, who were fighting in the northern part of Leyte, was extremely high, 61 percent, whereas among troops staged in Hawaii, who were fighting in the central part of Leyte, it was unusually low, only 5 percent.

Ultimately, the rate per 1,000 average strength in the Philippines was to rise to 0.43 in 1945 and 0.84 in 1946, an incidence not exceeded in the Army until 1947, when it reached 0.98 in Korea.

Diagnosis.—Specimens for virus study and for gross and microscopic examination were obtained from autopsies in six cases, and the virus team, in addition, collected stool and blood specimens from patients with the disease as well as from suspected abortive cases and from contacts. Injections were made immediately into laboratory animals, including monkeys from a neighboring island, and material from all specimens was sent to the 19th Medical General Laboratory and the Army Medical School laboratory. Preliminary reports of tissue examinations promptly confirmed the clinical diagnosis.

The virus of poliomyelitis was isolated at the laboratory of the Army Medical School, Army Medical Center, Washington, as well as by Dr. John R. Paul, Director, Commission on Neurotropic Virus Diseases, Army Epidemiological Board, from two fatal and two nonfatal cases in the paralytic group. No pathogenic viruses were obtained from the 10 patients with preparalytic poliomyelitis, although the clinical picture in all respects, including pleocytosis, was the same as in the paralytic group. In June 1945, a final and very exhaustive report of the laboratory studies in these 43 cases was made by Maj. Ray E. Trussell, MC, and his group on the virus team from the 19th Medical General Laboratory.

A number of cases similar to the cases in the preparalytic group were observed among contacts who were not admitted to hospitals or who did not have lumbar punctures. Many such cases were undoubtedly diagnosed as typical dengue. In fact, retro-orbital pain and backache occurred in many

of the paralytic cases, and the prevalence of dengue in the area made the mistake in diagnosis almost unavoidable.

Evidence of meningeal irritation led to the diagnostic lumbar puncture in six cases. In the remaining cases, flaccid paralysis or marked weakness of one or more of the extremities pointed to the diagnosis.

Source of infection.—The source or reservoir of this infection was a baffling question. No recent cases of poliomyelitis in Filipinos were discovered by visits to civilian hospitals, and none had been reported by the Philippine public health service. Certain facts pointed to the possibility that the disease might have been brought in by carriers among troops from the United States, where it was epidemic. In one area, the condition developed 5 days after the soldier had arrived on Leyte. In another area, three cases treated and discharged as lymphocytic choriomeningitis developed 2 weeks after the arrival of the men; these cases preceded the paralytic cases in that area by about a month. About half of the cases were in soldiers who had lived on farms or in very small rural communities. Although many individuals who had been in contact with patients who developed paralysis showed signs indicative of preparalytic poliomyelitis, only one man, a medical corpsman, developed the paralytic type of disease after contact with patients. He had attended poliomyelitis patients in respirators from 3 December to 6 December, and he came down with the disease himself on 17 December.

Observations in the Middle and Far East, made during the war and subsequently, showed that similar outbreaks of poliomyelitis occurred in troops foreign to the particular country without any apparent increase in incidence in any age group in the indigenous population.

It was impossible to make a proper investigation in the heat of battle, when distances were so great, transportation so difficult, and other duties so pressing. One could only conclude that, barring some extraordinary influences from previous military service in raising individual resistance to a virulent strain of poliomyelitis virus, the outbreak in the troops in the Dulag area was caused either by one or more very atypical poliomyelitis viruses of mild virulence or by one or more neurotropic viruses capable of producing the Guillain-Barré syndrome.

Clinical picture.—Clinically, the disease followed the pattern usual in adults. The age varied from 19 to 35 years, with an average of 23.5 years.

The initial invasive phase was not observed, although several patients reported having had slight colds a few days before becoming ill. In 10 cases, the onset was not unlike dengue, and the patients, in fact, were admitted to hospitals with this tentative diagnosis. They complained of intense headache, pain on moving the eyes, backache, and fever. Five patients had chills. Severe headache was the presenting symptom in 17 of the 33 paralytic cases and in all 10 of the preparalytic cases. Five patients were admitted complaining of severe abdominal pain; in this group, the admission diagnosis was appendicitis in three cases and gastroenteritis in the other two. One patient was

thought to have a back strain, and another was hospitalized because of recurrence of a perirectal abscess.

The majority of patients who died, as well as three who survived, had some involvement of respiration, and another patient had some involvement of the thoracic muscles on the left side. Abdominal respiration was absent in at least two of the fatal cases and in one patient who recovered.

In the cases in which records of the temperature were available, there was a fair correlation between the height and duration of the fever and the severity of the disease. In three fatal cases in which the temperature was known, it was up to 103° F. in a patient who died on the 3d day; up to 105.8° F. in a patient who died on the 26th day, after being completely paralyzed and maintained in a respirator; and up to 103° F. in a patient who died on the 11th day. Most of the patients who recovered had fever no higher than 101° F., but two had fever up to 102° F. and three fever up to 104° F., for several days, with early residual paralysis.

In 10 cases, paralysis was limited to one or both of the lower extremities, associated in three instances with weakness of the abdominal muscles. In three of the fatal cases, the legs and trunk were not involved. In another case, paralysis was limited to the pharynx and muscles of deglutition. In the other cases, involvement represented some combination of legs, trunk, thorax, arms, or cranial nerves. One patient had a transient facial paralysis, which cleared in 48 hours. Another had involvement of the 6th, 7th, and 10th cranial nerves, which disappeared entirely in a few days.

In addition to the fatal cases, two other patients had evidence of bulbar involvement. Lethargy or delirium was present in three cases and insomnia in one.

Six patients had to be catheterized, and two could not defecate without enemas. Three patients, two of whom were constantly in respirators, developed decubitus ulcers. In one case, jaundice appeared on the 11th day; it was thought to represent infectious hepatitis unrelated to poliomyelitis, since many sporadic cases of the kind were occurring at this time.

The white blood cells were counted in 12 cases. They varied between 6,500 and 16,400 cells per cubic millimeter.

There was no correlation between the number of white blood cells in the spinal fluid and the extent of early residual paralysis. In fact, seven patients with definite residual paralysis had fewer than 10 cells, with an average of 5. In contrast, in two of the preparalytic cases, the cells were over 100 in one and 330 in the other. The highest counts in the paralytic cases were 347, 458, 547, and 700; 10 other patients had more than 100 cells. Lymphocytes predominated, usually in the range of 75 to 95 percent. In a few early punctures, the spinal fluid showed a predominant and marked shift to lymphocytes.

DERMATOLOGICAL CONDITIONS

Skin diseases constituted a worrisome problem for most units, few of which had the services of a trained dermatologist. Every unit expressed the desire for



Lt. Col. John V. Ambler, MC, Dermatologist, 118th General Hospital, Southwest Pacific Area.



Lt. Col. Frederick T. Billings, Jr., MC, Medical Service, 118th General Hospital, Southwest Pacific Area.



Col. Ivy A. Pelzman, MC, Venereal Disease Control Officer, Office of the Chief Surgeon, USASOS, Southwest Pacific Area.



Lt. Col. Maurice A. Schmitker, MC, Consultant in Medicine, Office of the Surgeon, USAFWESPAC.

FIGURE 194. -Consultants in medicine, Southwest Pacific.

a consultant in dermatology, and the large number of faulty diagnoses and the amount of overtreatment of skin diseases observed by Colonel Thomas confirmed this need.

When a consultant in dermatology, Maj. (later Lt. Col.) John V. Ambler (fig. 194) reached the area early in 1944, he performed a most useful service

in improving and standardizing the diagnosis of skin diseases, which were most difficult to manage in a tropical climate under the stress of wartime Army life.

Atypical Lichen Planus

A study of 26 cases of atypical lichen planus in December 1944 from the Malaria Research Unit, 3d Medical Laboratory, was of considerable interest. When this unusual form of skin disease made its appearance in New Guinea, no cases had been seen in SWPA, nor were others known to exist. Before very long, the suspicion arose that there was some connection between the long continued use of Atabrine to suppress malaria and the development of atypical lichen planus. The information was deliberately suppressed, because Atabrine discipline was extremely difficult to maintain and because this drug had to be employed to prevent the military handicap of a high malaria rate.

Reports on the subject were written by one or two dermatologists serving with hospitals in New Guinea, and finally, at the suggestion of Colonel Thomas, the subject was studied and reported by Major Harvey, Captain Bang, and Lt. (later Maj.) John M. Myer, MC, with the help of several Sanitary Corps officers. Their work showed that some atypical patients with lichen planus in which Atabrine therapy had been interrupted exhibited an acute flareup of the lesions when the drug was resumed. This observation was substantiated in various studies on patients who were returned to the United States. In these studies, it was also found that lesions which had completely cleared reappeared after several months of renewed Atabrine therapy.

The study of Harvey, Bang, and Myer was the first to give some clear-cut evidence of the connection between atypical lichen planus and the long-continued ingestion of Atabrine. It was Colonel Thomas' opinion that this sort of clinical research, limited and pragmatic though it was, which was set up as the problem developed and the opportunity permitted, was about all that could be hoped for in an area like SWPA.

There were good reasons, as the Chief Surgeon, and the Chief, Professional Services, USASOS, pointed out, for not publicizing the connection between Atabrine and atypical lichen planus, as follows:

1. The number of cases was small, and the patients were all receiving careful study and treatment.
2. If even a rumor of such a relationship became widespread among the troops, it would result in still further evasion of the instructions to them that they must take Atabrine (p. 518).
3. The use of this drug was absolutely essential to prevent large bodies of troops from being incapacitated by malaria, and, therefore, no such statement, based, as it still was, largely on inference, should be made official or circulated.

The situation in respect to Atabrine and atypical lichen planus was typical of the misinformation and misapprehension which were always recurrent and troublesome in this area.

FILARIASIS

On his first trip to New Guinea, in October 1943, Colonel Thomas learned that cases of filariasis contracted on Tongatabu Island in SPA were under observation in the 52d Evacuation Hospital, which was then on Woodlark Island, off the eastern tip of New Guinea, under the Sixth U.S. Army. With the assistance of Colonel Dart, then serving as Surgeon, Intermediate Section, in New Guinea, Colonel Thomas obtained permission from the Commanding General, Sixth U.S. Army, and Colonel Hagins, the Army Surgeon, to proceed to this island. On the way there, and again on the way back, profitable visits were paid to Colonel Hagins at Sixth U.S. Army Headquarters on Goodenough Island.

Maj. (later Col.) Joseph B. VanderVeer, MC, Chief, Medical Service, 52d Evacuation Hospital, arranged a demonstration of the patients with filariasis then under treatment. Only one or two then showed activity in the form of swollen lymph nodes and lymphangitis. The information collected on this visit was incorporated in the ETMD, SPA, for October 1943, as follows:

Since occupation of Woodlark Island by U.S. forces, about 30 cases of an atypical epididymitis and vasitis were observed, all in men who had previously served in Tongatabu.

This disease is peculiar and atypical in the following respects: In a large number of cases, there is no history of a previous urethral discharge. Vasitis, evidenced by lower quadrant pain, is the first manifestation. The spermatic cord is involved to a much greater degree than is usual in a gonorrheal epididymitis. An inflammatory hydrocele is generally present in the early stages of the disease.

A single microfilaria (*Wuchereria bancrofti*) was observed in a wet blood smear (coverglass technique) from one of these patients. The specimen was secured from the peripheral blood at 2100 hours, and the presence of the microfilaria was confirmed by three qualified medical officers. No microfilariae were observed on stained blood smears, many of which were taken at various times through the day and night. The disease was presumed to be due to filariasis (Bancroft's) on the basis of the observation of the single microfilaria just mentioned and the fact that all the patients with the syndrome had previously served in Tongatabu, where this disease was prevalent.

The clinical manifestations began with a dull, aching pain in one of the lower quadrants, which gradually radiated down the spermatic cord of the affected side. The abdominal pain was followed by painful swelling of the epididymis and vascular structures of the cord, without involvement of the vas deferens. About 30 percent of the patients developed hydroceles, two of which were of such size that aspiration was necessary for relief of pain.

These patients were isolated in the hospital at the time of Colonel Thomas' visit, and further studies were being carried out in an attempt to substantiate the presumptive diagnosis. Their infectivity could not be readily determined, and since their period of hospitalization would be longer than 30 days and

treatment in a temperate climate was probably indicated, it was desired that a high echelon decide upon their disposition.

Colonel Thomas suggested to Major VanderVeer that an antigen be made from a lymph node subsequently shown to contain filariae and that it be used cautiously for skin testing. The suggestion was carried out, and a report on the experiment was submitted to the Office of the Surgeon General for publication. Permission for publication was refused, for two reasons, that the photomicrograph submitted could not be definitely identified as showing filariasis and that experts did not believe that the antigen used would have given positive results in the patients and negative results in a control series, as was reported. The reasoning was perhaps sound, but it was felt that a piece of clinical research accomplished in the jungles of New Guinea, without benefit of equipment or consultation of the medical literature, deserved some commendation and encouragement.

On the recommendation of Colonel Thomas, these 30 patients were transferred to the 118th General Hospital in Sydney, where they were carefully studied and later reported by Maj. (later Lt. Col.) Thomas McP. Brown, MC. The return of some of these troops to a nonfilarioid tropical location, 6 months after their symptoms had disappeared, showed that this interval had served to desensitize them to the lymphangitis syndrome.

Filariae were observed in thick smears taken in malaria surveys among New Guinea natives, but no other active cases were encountered by the medical consultant. No case is known to have developed among U.S. military personnel in the SWPA, no doubt owing to the active avoidance of contacts between soldiers and natives and to the sanitary regulations which reduced flies as well as mosquitoes in camp areas.

SCHISTOSOMIASIS

Schistosomiasis constituted a major clinical problem in the Philippines. The risk of infestation with *Schistosoma japonicum* flukes had been anticipated before the invasion of Leyte, and both medical and line officers had been warned not to drink or wash with water from streams and not to eat native or any uncooked food. It was not always easy to obey these regulations. The terrain through which the early fighting took place necessitated standing for days in wet rice paddies and drinking unfiltered water. Superchlorination of drinking water was advised, but it could not be supervised. Doubtless, too, the sight of civilian Filipinos standing waist deep in all the streams while they washed their clothes encouraged carelessness. Before suitable shower baths were provided, many soldiers probably washed with water from streams.

By the time the campaign in the Philippines was concluded, it was estimated that more than a thousand U.S. Army personnel had been infested with *S. japonicum*. They represented the first cases of this infestation in the U.S. Army. The majority of cases developed during the early days of the invasion, when, as already mentioned, the troops had to fight through infested rice paddies and Army engineers had to work in water up to their armpits repairing bridges

that the retreating Japanese had destroyed. There was no known way that these men could have avoided contact with the cercariae, which were abundant in most of the fresh water on the eastern side of the island.

Research and Publications

At a meeting of survey units called by the Sixth U.S. Army malariologist, Maj. David R. Minter, MC, in November 1944, a far-advanced case of schistosomiasis in a native was presented, and a number of pertinent questions were raised. Among them were what forms of clothing other than rubber boots could prevent infection; does superchlorination purify water; and what measures should be used to eradicate snails. It was agreed that very little was known about the early stages of the disease and that local bites and urticaria were likely to be overlooked by troops who had been immersed in water for 5 to 7 days.

Capt. Malcolm S. Ferguson, SnC, made a survey of the coast and found water available in some wells and two rivers free of cercariae. He found no snails on the west side of the island. The snails were small, about 0.5 cm. long, and about 1 in every 200 to 300 was infected (fig. 195). The technique was to dry them 2 days, then mash them and examine them under a low-power microscope. The Japanese were making an elaborate survey of schistosomiasis when they were interrupted; they were using German stains, which were better than those available in U.S. laboratories.

Fortunately, records of a careful survey of Leyte for snails infested with *Schistosoma cercariae* made in 1939-40 by the Philippine bureau of health from Manila were found undisturbed by the Japanese Army. These records showed areas up and down the eastern coast of the island and well up the Leyte Valley harboring the snail host, *Oncomelania quadrasi*. Captain Ferguson confirmed this, finding as many as 1 infected snail in every 75 to 100 snails examined near houses in some areas.

Captain Bang transferred his interest from malaria, which was not a problem in Leyte, to schistosomiasis, and was given small but quite adequate facilities at the 118th General Hospital. Here he and his associate, 2d Lt. Nelson G. Hairston, SnC, together with Captain Ferguson and the 5th Malaria Survey Unit, made interesting observations on the effect of treatment in schistosomiasis japonica in laboratory animals. They also made some progress in establishing methods for the use of repellents when infested water could not be avoided.

At the 126th General Hospital, Colonel Tillman, Chief, Medical Service, studied and reported a series of patients who showed signs of early cerebral involvement. At the 117th Station Hospital, Maj. Albert S. Johnson, Jr., MC, and Maj. (later Lt. Col.) Maxwell G. Berry, MC, discovered and described the sigmoidoscopic picture found to be pathognomonic of acute schistosomiasis. Maj. (later Lt. Col.) Mark M. Bracken, MC, Chief, Laboratory Service, 27th General Hospital, published original observations on fatal early cases. In the spring of 1945, after Colonel Thomas had returned to Manila

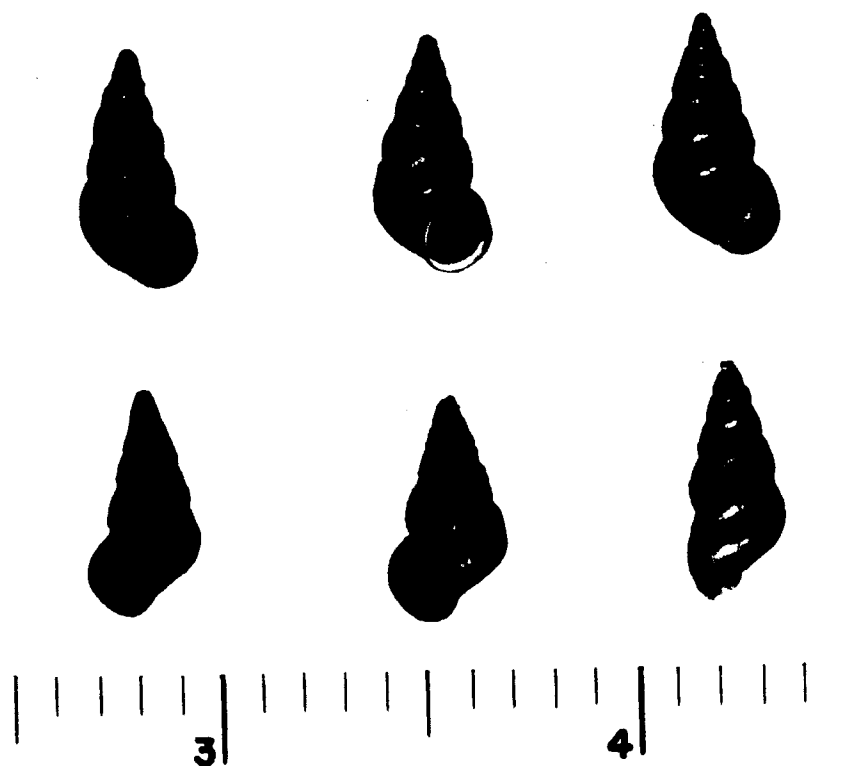


FIGURE 195.—Snails of the type harboring cercariae, transmitters of schistosomiasis. Scale in centimeters.

from the Sixth U.S. Army, he and Major Bracken prepared an article on schistosomiasis for the newly planned USAFPAC monthly medical bulletin. This article summarized the historical, clinical, and laboratory observations made on the disease in various hospitals and laboratories in New Guinea and Leyte.

As a result of observations on the first acute cases of schistosomiasis (p. 551), Colonel Thomas prepared a paper with the help of Capt. David P. Gage, MC. It had been hoped that this report would prove instructive to medical officers throughout the theater, but publication was delayed in the Office of the Surgeon General because the article recommended that treatment based on a conclusive clinical diagnosis be instituted even before mature ova could be demonstrated in the stools. The need for the earliest possible treatment to put a stop to tissue damage from further deposition of ova was regarded in the theater as a real and urgent problem. The paper was finally published in the *Bulletin of the U.S. Army Medical Department*.⁵

The information contained in Technical Memorandum No. 15,⁶ prepared by Colonel Eppinger and Colonel Thomas in October 1944, is summarized elsewhere.

⁵Thomas, H. M., Jr., and Gage, D. P.: Symptomatology of Early Schistosomiasis Japonica. Bull. U.S. Army M. Dept. 4: 197-200, August 1945.

⁶Technical Memorandum No. 15, Office of the Chief Surgeon, Headquarters, USAFFE, 21 Oct. 1944.

On 25 April 1945, the Subcommittee on Schistosomiasis, of the Commission on Tropical Diseases, Army Epidemiological Board, arrived in Leyte and was housed in prefabricated buildings in Tacloban. The members of the Subcommittee were Dr. Ernest C. Faust, professor of parasitology, School of Medicine, Tulane University of Louisiana; Dr. Willard H. Wright, Division of Zoology, National Institute of Health, U.S. Public Health Service; Dr. Donald B. McMullen, associate professor of hygiene and public health, School of Medicine, University of Oklahoma; Maj. George W. Hunter III, PhC; Sgt. Preston W. Bauman; and Sgt. James W. Ingalls. Their work was implemented by the use of laboratory animals transported by air across the Pacific, and much gratitude is due the medical supply section of the Chief Surgeon's Office, USASOS, for its effective cooperation. The Subcommittee studied the clinical observations made in Army hospitals and confirmed and amplified Captain Bang's observations.

Early observations.—All medical officers had been instructed to look out for early clinical cases of schistosomiasis, even though it was hoped that protective clothing, particularly shoes, leggings, trousers, shirts, and in some instances rubber boots, would prevent penetration of the skin by *S. cercariae* and that other precautionary measures would reduce the chances of exposure to a minimum.

Early in December 1944, Colonel Thomas was asked to see two patients with possible early schistosomiasis in the 36th Evacuation Hospital. They had been in rice paddies (not yet surveyed for snails) for about 4 days. Later, when they lay down on dry ground, they had severe itching about the hips, which they thought due to ants. Still later, they were in foxholes filled with water for about a week. A week before Colonel Thomas saw them, they had developed severe cramps in the abdomen, without fever or diarrhea; the single loose stool each had passed was without mucus or blood. The leukocytosis was 40,000 to 50,000 per cubic millimeter, with 30 percent eosinophiles in one case and 20 percent in the other. There were numerous hookworm ova in the stools in both cases. The formaldehyde test on blood serum was negative, as was the euglobulin test. No schistosoma ova were found. The lungs were clear, and the abdomen was negative except for one finger-breadth hepatic enlargement; the liver edge was smooth.

It was concluded that these patients had hookworm and, possibly, schistosomiasis. About the same time, Colonel Thomas examined several late cases of the disease in Filipinos.

In other patients, the first suspicious clinical entity was generalized urticaria, with or without abdominal discomfort or diarrhea and with or without leukocytosis and eosinophilia. The clinical symptoms cleared up promptly, and stool examinations were either negative or, as in the cases just described, revealed hookworm ova. The cases were regarded as suspicious, and the soldiers were told to return in 2 weeks for repeat stool examinations.

Meantime, on 30 December 1944, in the laboratory of the 36th Evacuation Hospital, a specimen stool from an officer patient was found to contain ova

with characteristics of immature *Schistosoma* ova, and 2 days later, another officer from the same unit presented similar findings. The summarized histories of these patients follow:

Case 1.—A 25-year-old Medical Corps captain, serving in a portable surgical hospital, arrived in Leyte on 20 October 1944. His unit supported a division which fought from the beach landing near Tacloban through rice paddies along the road to Palo. Later, the unit was camped near Dulag on the road to Abuyog.

About 1 November, the patient had a mild attack of dengue, from which he recovered in 5 days. He remembers swimming in a stream for 20 minutes on 15 November. The current in midstream was too swift for swimming, so he and his companion (case 2) stayed in the still water near the bank. Two hours later, he took a shower bath and washed with soap.

During the first week in December, he, like many of the soldiers throughout the task force, suffered a mild attack of dysentery, which lasted 4 days. The illness was characterized by anorexia, diarrhea with blood and mucus, urticaria around the waist and thighs, and fever. He seemed to respond to the usual course of sulfaguanidine. About 10 days later (16 December), however, he noticed vague upper abdominal discomfort, and his appetite became poor. He also developed a dry cough.

He was sent to the hospital on 27 December. Here his temperature rose daily from normal in the morning to 101° F. in the evening; one evening it reached 102° F. Examination was negative except for a slightly enlarged, tender liver. The spleen was not palpable, and the lungs were clear. Roentgenograms of the lungs on 28 December showed a few very small areas of infiltration in the central portion of the left lung. The findings on 31 December were the same.

Blood counts, which revealed no anemia, were as follows:

28 December, 12,300 white blood cells per cubic millimeter; 67 percent neutrophils, 13 percent eosinophiles, and 20 percent lymphocytes.

31 December, 12,750 white blood cells per cubic millimeter; 56 percent neutrophils, 23 percent eosinophiles, and 21 percent lymphocytes.

Stool examination on 28 December was negative for blood, pus, ova, or cysts. A repeat examination on 30 December, after magnesium sulfate, was positive for *Schistosoma* ova.

After ova had been found on two other stool examinations, treatment with Fuadin was begun 2 January 1945.

Case 2.—A 33-year-old Medical Corps captain, serving in the same portable surgical hospital as the patient just described, had the same history of swimming on 15 November, and his movements were the same. During the last week in November, he was hospitalized with what was thought to be dengue; he returned to duty in 10 days. For some years he had had a smoker's cough, in which there had been no recent change.

On 23 December, this patient began to run an evening fever, with chilly sensations, and 5 days later he was admitted to the 36th Evacuation Hospital. There his temperature curve was similar to the curve described in case 1. On physical examination, the lungs were clear, which was confirmed by roentgenograms. The abdomen was slightly distended, and there was well-marked tenderness over the liver, best demonstrated by fist percussion over the epigastrium and just below the right costal margin. The spleen was not palpable.

The red blood cell count was 4,200,000 per cubic millimeter. On 28 December, the white blood cell count was 14,400 per cubic millimeter, and on 1 January 1945, it was 14,450. The neutrophils were, respectively, 64 percent and 41 percent; the eosinophiles, 22 percent and 34 percent; and the lymphocytes, 14 percent and 24 percent.

Stool examinations on 24 December and 31 December were negative. On 1 January, after magnesium sulfate, the examination was positive for *Schistosoma* ova.

Treatment with Fuadin was begun on 2 January.

At this time it was not thought that swimming in a large, swift river, in the still water near the bank, was sufficiently significant to eliminate the need for careful investigation of these patients' activities to search for other possible causes of their illness.

Clinical Considerations

The etiology, clinical aspects, treatment, and prevention of schistosomiasis had already been described. In Technical Memorandum No. 5,⁷ 31 March 1945, clinical aspects of the disease, laboratory refinements in diagnosis, and precautionary measures were described in more detail. Observations in U.S. Army troops had indicated a characteristic clinical syndrome upon which a presumptive diagnosis might be made before the ova of *S. japonicum* could be demonstrated in the feces. This was important in initiating early treatment, for the period of diagnosis was sometimes prolonged, even in patients with severe symptoms. The diagnosis could not be properly made from clinical findings alone unless there was a clear-cut history of exposure in waters known or suspected to be infested. Persistent efforts should be made to demonstrate ova in feces when treatment had been started on the basis of a presumptive diagnosis.

A summary of the clinical and laboratory data in Technical Memorandum No. 15 follows:

1. Clinical symptoms leading to the diagnosis of schistosomiasis appear during the sixth, seventh, or eighth week after exposure and are of varying severity. Some patients are seriously ill, with high fever and great loss of weight. Other patients are asymptomatic, and their disease is discovered only in the course of routine stool and blood examinations. More severe manifestations apparently appear earlier after exposure and may represent massive infections. In an analysis of 40 cases, symptoms in order of frequency were fever in 38, headache in 33, anorexia in 30, nonproductive cough in 27, chills in 21, abdominal cramps in 12, urticaria in 10, diarrhea and backache in 7 each, and pruritus in 4. It should be noted that neither urticaria nor diarrhea is a frequent symptom.

2. Physical examination reveals a slightly or moderately enlarged liver, which is nearly always tender to palpation or heavy percussion. The spleen is felt early in the disease in about a quarter of all cases. The lungs are usually clear, though occasionally, coarse rales or rhonchi can be heard. Roentgenologic examination of the lungs occasionally demonstrates scattered small areas of infiltration.

3. The temperature is usually low in the morning but rises in the afternoon, reaching from 101° to 105° F., depending upon the severity of the toxemia in the individual case (Katayama disease). A septic, spiking temperature curve is very characteristic, but elevations may be irregular. The fever falls by lysis after the second week. It is affected only slightly by treatment. The

⁷ Technical Memorandum No. 5, Office of the Theater Surgeon, Headquarters, USAFFE, 31 Mar. 1945.

pulse rate is proportionate to the fever. In a few cases, the respiratory rate is elevated, and respirations may be somewhat shallow.

4. On proctoscopic examination, characteristic pseudotubercles can be seen in the wall of the rectum or lower sigmoid in about two-thirds of the proved cases. Biopsy of these nodules (which is not advised as a routine procedure) yields groups of ova. In appearance these nodules resemble those seen in the bladder wall in cases of *Schistosoma haematobium*.

5. The stool is normal or soft. *Schistosoma* ova are found for the first time from 6½ to 10 weeks after exposure.

A simple technique for stool examination follows: From 15 to 20 gm. of stool is emulsified in 300 cc. of normal salt solution, then filtered through six layers of gauze and allowed to settle for one-half hour. The supernatant fluid is poured off, the specimen is washed twice more with normal salt solution, and the sediment is examined microscopically. This technique gives excellent results. Direct smear of fecal mucus yields only about a third as many positive examinations as the concentration method.

Under high power, the large ovum (60μ to 80μ) is seen to contain a well-differentiated miracidium which may exhibit movement, and so-called flame cells can be made out. Immature ova are found in the stools fairly often. They may be much smaller than mature ova and may be confused with ova of other worms such as the fish tapeworm (*Diphyllobothrium latum*) or the roundworm (*Ascaris lumbricoides*). This finding should be recorded as "Immature ova—possibly *S. japonicum*," but it should not be accepted as conclusive diagnostically. Subsequent examinations usually reveal mature ova.

6. Eosinophilia is present in nearly every case. A rapid rise in the total number of eosinophiles is characteristic of the acute phase, in which they often reach 20,000 per cubic millimeter. In this phase, an increasing leukocytosis accompanied by an increasing percentage of eosinophiles (from 50 to 70 percent and sometimes 90 percent) is almost pathognomonic. In later stages, the eosinophile count often falls to 5 to 10 percent.

High eosinophile counts may also be encountered in the acute phase of infestation with hookworm or *Ascaris*. There are other differences in the clinical picture, however, which distinguish schistosomiasis from these diseases.

7. In occasional cases, a hitherto undescribed syndrome has been associated with cerebral involvement. There is slight or moderate disorientation, or even coma. The arms are weak, and one or both seem paralyzed. The legs are ataxic. Deep reflexes are exaggerated, and there may be ankle clonus. Sensation is usually normal. Cerebellar symptoms may be present. There is low-grade fever, as well as a characteristic leukocytosis with eosinophilia. The spinal fluid may contain a few lymphocytes or may be normal.

Treatment

Standard forms of treatment for schistosomiasis were outlined in USAFFE Technical Memorandum No. 15.⁸ It was recommended that treatment be

⁸ See footnote 6, p. 553.

started in typical cases even before ova were demonstrated in the stools. A preference for one drug or another could not be expressed at this time. Both tartar emetic and Fuadin were used.

Tartar emetic had caused a number of unpleasant reactions, and it was recommended that it be used with caution. The solution could be made by adding chemically pure tartar emetic to pyrogen-free distilled water which had been brought to a boil. In several hospitals, it had been found useful after the first three doses to dilute the tartar emetic in 1,000 cc. of 5-percent glucose solution and administer it slowly over the course of an hour. Injections were stopped if a reaction occurred. Coughing was not a serious reaction, but vomiting, undue nervousness with shaking, severe arthralgia, or collapse with fall in blood pressure were serious. If they occurred, the next dose should be reduced by 0.03 or 0.06 gm.

Fuadin, to date, had been well tolerated. The efficacy of emetine had not been proved, and Anthiomaline (lithium antimony thiomalate) was still on trial.

All patients with a diagnosis of schistosomiasis should be given a complete course of treatment before arrangements were made for their subsequent care.

Disposition

Seriously ill patients and those with involvement of the central nervous system were evacuated to the United States without delay. Those who had persistent clinical signs or positive laboratory findings after a course of treatment should also be evacuated. Patients who appeared to have been cured and to have regained their health could be returned to duty but required frequent examination of their general condition and of blood and stool specimens, in accordance with instructions in a letter from Headquarters, USAFFE.⁹

Preventive Measures

Before the invasion of the Philippines, an attempt at widespread distribution of information concerning schistosomiasis had been made, but so many troops were on the move that large numbers did not receive adequate information. This situation was corrected promptly when the troops arrived on Leyte (fig. 196). The Sixth U.S. Army had taken pains to inform all its medical officers concerning this disease before the invasion. That the forewarning was not in itself adequate protection was clearly apparent. As soon as possible, all fresh water streams and rivers were posted with signs and cartoons depicting the dangers of schistosomiasis, but drivers of Army motor vehicles persisted in washing their vehicles in these infected streams (fig. 197). It seemed, when the plan was instituted, that the horrors of schistosomiasis were made to sound almost too dreadful when they were broadcast through the wards of hospitals in which patients with the disease were being treated, but past experiences

⁹ Letter, Col. R. E. Fralle, AGD, Adjutant General, Headquarters, USAFFE, to commanding generals of major commands, 5 Mar. 1945, subject: After-care of Patients With Schistosomiasis.



FIGURE 196. Schistosomiasis exhibit and demonstration on Leyte.

with the difficulties of maintaining Atabrine discipline suggested the necessity of employing the most drastic warnings possible.

The personnel of the 118th General Hospital was particularly well informed about schistosomiasis. The commanding officer had stopped by the Office of the Surgeon, USAFFE, at Hollandia, when the unit was en route to Leyte, and he had passed on to each member of the hospital all the information he secured. This hospital set up in an area directly bounded by a fresh water stream which was highly infested. Lectures to all the personnel were given on a number of occasions, and they were warned against any contact at all with water from this river. Swimming was permitted in the ocean. Later on, when a large number of enlisted men in the unit came down with schistosomiasis, it was learned that they followed instructions and went swimming only in the ocean, but some of them could not resist washing the salt water off their bodies with a little fresh water out of the river, and they were the ones who contracted the disease. That no officer or nurse in this unit, only enlisted men, were affected must be an example of one of the cardinal laws that define the limitations of preventive medicine.

PSYCHONEUROSES

Causative Factors

In New Guinea, Army troops lived under unusual stresses and strains even when they were not engaged in active combat. These included the equatorial weather, which was always hot and humid and usually rainy; the broken



FIGURE 197. Prevalence of snails in Philippine streams and ponds.

sleep, under mosquito bars; the work under constant pressure to get things done; the long hours without time off; the stringent limitations of recreational facilities; the feeling of being a long way from home, possibly for the last time; the constant repetition of big and little frustration; the sapping of one's own energy in the effort to give the other man a lift; the frequently observed Army tradition of working late into the night 7 nights a week; the feeling of being far up in front without any understanding of the situation from headquarters in Australia; all of the worry about strange diseases such as so-called jungle rot and elephantiasis; and the bright-yellow hue of the skin which so many of the soldiers developed from Atabrine. All of these things, and many others, combined to provide continued nervous strain. In addition, frontline troops had to fight in repeated task force engagements of landing operations followed by jungle warfare (fig. 198).

It is no wonder that the hospitals were partially filled with neuropsychiatric patients. Many had developed an ill-defined form of acute psychosis which was similar in many respects to acute schizophrenia. Surprisingly, however, these patients recovered when they were removed from the area of stress and strain and given reasonable psychiatric nursing care.

Management

For some time, in the absence of correct diagnoses and proper psychiatric care, patients with borderline mental conditions were evacuated from New Guinea for the long distance back to general hospitals in Queensland, Australia.



FIGURE 198. Rest after three continuous days in battle without relief, Los Negros, Admiralty Group, March 1944.

After quick rehabilitation, they were returned to duty, only to report to sick call again and repeat the same process. After several failures of this sort, many of these men were evacuated to the United States until it finally became necessary to forbid evacuation for psychoneurosis alone.

The neuropsychiatric service was gradually built up with station hospitals provided in New Guinea for the sole purpose of treating minor psychiatric disorders. Later, when the general hospitals moved closer to the combat areas in New Guinea and in the Philippines, they also helped provide the earlier diagnosis and treatment that are of such great value in these cases.

Medical ward officers were confronted by all possible forms of minor psychiatric disorders and were poorly prepared, either by training or experience, to handle them. The psychiatric service could give only limited help. It had more than it could do to arrange for the simplest and crudest care of seriously ill neuropsychiatric patients in New Guinea.

Colonel Thomas sent a concise report of this situation to the Chief, Professional Service Division, Office of the Surgeon, Headquarters, USASOS, but the report was not commented on. A year later, Colonel Thomas learned, from the neuropsychiatric consultant himself, that the report had been interpreted to mean that the medical consultant did not recognize the limits of his responsibility and wished to take over psychiatry as well as medicine. Colonel Thomas, who had worked closely in the Fourth Service Command with Col.

(later Brig. Gen.) William C. Menninger, MC, Consultant in Neuropsychiatry, Office of the Surgeon General, had naturally done nothing to correct this erroneous impression since he had been entirely unaware of it.

In the Sixth U.S. Army, there was similar misunderstanding of the value of a consultant in psychiatry to an army on the march. It does not seem likely that the same difficulties will ever occur again from lack of understanding and cooperation between the medical and neuropsychiatric services. In the isolated and farflung area in which the New Guinea fighting occurred, consultants seldom encountered each other, and they were left to solve their own problems, with no one to guide or help them. Unfortunately, from the standpoint of the Army neuropsychiatric service, peacetime provides none of the stresses which cripple soldiers during war. The Medical Corps, as well as the whole medical profession, should not forget the important lessons it learned the hard way from its experiences, both positive and negative, in psychiatry during World War II. Enlightened chief consultants and medical consultants can and should contribute to progress in this field.

Conclusion and Recommendations

So that the same situation does not recur, areas of cooperation and ways and means for combined effort should be elaborated in some detail for the future instruction of military medical consultants. During one period at Headquarters, USASOS, Colonel Thomas prepared a preliminary draft of a report on the recognition and treatment of functional symptoms. Because there was no opportunity to rewrite it in conjunction with the neuropsychiatric consultant, the report was never submitted for approval and publication. The proposals made in it, however, pointed to a borderline problem which needed the combined attention of the senior consultants in neuropsychiatry and medicine.

The substance of this report was as follows:

1. The organization of special station hospitals for the treatment of nonpsychotic psychiatric patients was required in SWPA by the shortage of trained neuropsychiatrists and the need for additional facilities for treatment. Most station, evacuation, and field hospitals had no neuropsychiatrists. Unearthing, recognizing, and handling properly the functional aspects of medical and surgical states was the responsibility of members of the hospital staff and was the greater because officer patients with functional complaints were not treated in the special station hospitals.

2. Most medical conditions have, to use a simple term, an important psychological side. Neuropsychiatrists reported that patients received from medical and surgical services in other hospitals have not been benefited psychologically during their hospital stay but instead have been actually impeded. This correctable state of affairs requires prompt attention.

3. Great improvement in the diagnosis and care of functional disease can be effected in medical and surgical wards if chiefs of service will keep the problem uppermost in their minds. They should familiarize themselves with

available technical memorandums and articles in current medical journals on this subject. Opportunities should be made available to attend staff meetings at psychiatric hospitals and to obtain formal and informal instruction from consulting neuropsychiatrists.

4. Much so-called psychotherapy consists of studying the patient's psychologic reactions and giving him appropriate encouragement, an explanation of his position, or both. This is no easy matter but one that requires understanding and tact. There are, however, a few primary rules which should govern the approach to every hospital patient, as follows:

a. The medical officer should treat every patient as a soldier, with due regard to his rank, branch of service, and Army experience. That is, the patient should be given full credit and suitable complimentary comment—often better implied than expressed directly—for bravery or interesting experiences or simply endurance when the going was tough. Such an approach shows the patient, as well as other patients on the ward, that his Army career is recognized as of primary importance; it is the reason he is in the hospital and is the reason for his getting out of it as quickly as is consistent with his disease or wound.

This attitude is the hospital medical officer's biggest contribution to Army morale. It does not mean rigid military formality, but it does mean punctilious observance of a respectful attitude to the patient as a soldier.

b. The medical officer should be alert for indications of worry, discouragement, discontent, or anxiety and, when he observes them, should develop a technique for drawing the patient out. This holds not only for the patient with a majority of functional symptoms (often loosely called psychoneurotic) but also for the patient with organic disease colored by, or associated with, minor but still important psychologic difficulties. Every good history should reflect the patient's state of mind as well as of body.

c. Many battle injuries and diseases, if not most of them, in combat troops introduce new psychological situations. Perhaps, for the first time, the individual's physical integrity is threatened, and he develops concern and a feeling of insecurity. On the other hand, he may develop a sense of relief at merely being wounded and not killed and may have—at least in his own eyes—an available and justifiable excuse for escaping from further danger. Everyone has, in some way or other, used illness as an escape mechanism or as a means of obtaining sympathy or attention. These and other psychological effects of disease and wounds required careful consideration and treatment.

d. Prompt and thorough study of each case from an organic point of view is essential. Unless this is done, the patient's doubts are unresolved and magnified. As time drags on, he senses uncertainties on the part of the medical officer, and having had time to learn the ways of the ward, he subtly takes control of the management of his own case. These developments complicate the solution of the psychological problem. In a station hospital, 5 days should be sufficient to reach a stage in the diagnostic study at which immediate disposition can be determined; that is, transfer to a general hospital (though not necessarily at once), or further treatment in a station hospital with a view to

return to duty or transfer to a convalescent hospital, or consultation with a psychiatrist to help outline further disposition.

5. Specialists in the care of borderline psychiatric cases have been assembled in special station hospitals devoted to psychiatric diagnosis and treatment. Here, accurate differentiation of cases into various scientific subdivisions takes place. Seriously ill psychotic states are quickly diagnosed, and the patients are transferred to general hospitals. Milder cases are divided into psychoneurosis, simple adult maladjustment, and constitutional psychopathic state, and appropriate treatment is accorded each group. Group psychotherapy, occupational therapy, exercise, and controlled relaxation provide essential features to augment a limited amount of individual treatment.

These hospital units have proved highly efficient and are returning 85 percent of patients to duty in an average of 16 days.

6. The function of the original field, evacuation, and station hospitals is to assist this program by considering every patient a potential psychological problem. This attitude will save a great deal of time in the first hospital to which the patient is admitted, and, more importantly, it will save even more time in the special hospitals. Finally, it will return to duty some patients who must otherwise be crowded into special hospitals, and it will make all other patients leave the hospital with improved morale.

In New Guinea, as might have been expected, medical units were also affected by the tremendous stresses already listed, and in some instances, officers broke down. A medical laboratory, in one such instance, lost its commanding officer, who was evacuated on the diagnosis of psychosis—confused state, and the next senior officer, a major, assumed command. When the laboratory was investigated during a routine visit by an inspector general, it was immediately apparent that he had neither the administrative nor the professional ability requisite for the position. None of the subdivisions of the laboratory was receiving appropriate supervision. No one could accomplish effective work. The morale was so bad that one excellent officer was found guilty by the inspector general of having consumed a considerable part of the laboratory alcohol. Had it not been for the timely visit of the medical consultant, this young officer might have been found guilty by a court-martial and returned home in disgrace. When he was transferred to another unit, however, he found a congenial metier in working on scrub typhus, and he did brilliantly thereafter and was finally promoted to the rank of major.

Part III. Conclusions and Recommendations

ANALYSIS AND CONCLUSIONS

During wartime, the professional activities of the U.S. Army Medical Corps, which from numerical necessity are carried on chiefly by recently inducted civilian physicians, require supervision and correlation. This fact has been demonstrated and is widely accepted.

In World War II, the machinery that developed to accomplish this supervisory and correlative function, in large part through the efforts of General Morgan, consisted of a loosely organized body of consultants. The group, which began with consultants in medicine and surgery, and, somewhat later, in neuropsychiatry, in this office, was gradually extended to include the theaters, service commands, armies, and base sections. The program developed without a table of organization, without an established standing operating procedure, and without any individual direction. It answered a different need in each command and assumed a different position in relations to each local organization.

The consultant system blossomed under some surgeons and struggled under others. It correlated the work of good units, and it supervised and, through training and education, improved the work of poor units. In the end, it played a major role in the medical activities of all commands.

The success of the system was based on three factors, as follows:

1. It fulfilled a need.
2. Its personnel was chosen on the basis of professional training and competence and, to some extent, on the basis of military experience, not on the basis of academic or military rank.
3. It operated on the principle that the visiting of units was its starting point and that visits must be painstaking and helpful. From their own firsthand study of actual situations, the consultants discovered and attacked existing problems.

A consideration of the consultant system as it operated in SWPA leads to certain general conclusions, and these conclusions, in turn, suggest methods for effecting improvement.

The Professional Consultants' Position in the Army Organization

Consultants are staff officers serving on the staff of a surgeon. Their province is professional services, each in his own specialty. In a sense, they perform the well-understood Army function of inspection, including visits to units, with subsequent reports and recommendations. In addition, they accomplish another new and less well understood function, that of instruction.

The consultants in World War II were drawn from the faculties of the leading medical schools in the country. They encountered questions from newly inducted medical officers, and they assumed the role of instructors by force of necessity.

The types of advanced instruction needed in wartime Army hospitals included bedside, ward, and clinic demonstrations, as well as instruction in Army methods of admission, disposition, and recording. To fulfill this function in a single unit required time—several days' time—in each unit. At the end of this time, the consultant knew the unit medical (or other) service, and the service knew the consultant. Each learned from the other, and morale was strengthened. This was a new kind of Army inspection.

The surgeon should know and rely on his consultants. They, in their role as staff officers, should advise him and should understand him and each

other. Whenever practical, the surgeon should personally select his staff officers. Having chosen them, he should require and bring to pass the closest cooperation among them. This applies possibly more to the chief professional consultants than to other staff officers because their duties involve the initiation of innovations as well as varied intersectional cooperation and contact with major commands.

Whenever surgeons have chosen their own consultants, often with advice from higher headquarters, the resultant relations have been agreeable and have been functionally successful. Whenever practical, newly appointed surgeons should therefore be permitted to select their own consultants. The three chief consultants to The Surgeon General should combine to help to provide the most suitable group of consultants in the various headquarters at lower levels.

Other staff officers spend from 90 to 98 percent of their time performing staff duties at headquarters. Professional consultants' major functions are performed away from headquarters, in the hospital units themselves. Difficulties then arise in developing them into competent staff officers.

Consultants who spend half or two-thirds of their time in the field find themselves writing reports and making recommendations which are returned to their own desks for implementation and completion. The need for close cooperation between the consultant section and the sections of personnel, plans, supply, preventive medicine, and records requires constantly available officer personnel in the consultant section. It therefore becomes important to establish the consultant system in the overhead tables of distribution and to provide adequate personnel for the accomplishment of the duties that are to be performed at the various headquarters on the different levels.

The Place of Consultants in the Wartime Medical Corps

In World War II, the approximately 1,300 medical officers in the Regular Army were used to fill important command and staff positions. As it ultimately developed, the direction of practically all professional matters relating to medicine, surgery, and neuropsychiatry became the responsibility of a consultant system composed entirely of civilian physicians called to active duty. This was not true of preventive medicine, dentistry, veterinary medicine, nursing, nor was it true of other activities such as planning and training, hospitalization, and medical supply.

Since the final responsibility in practically every major command rested in a Regular Army command surgeon and since staff action at the highest level was often involved, it would have been valuable to have officers in the Regular Army Medical Corps integrated into the consultant system. Officers such as Brig. Gen. Henry C. Coburn, Jr., Col. Frank L. Cole, MC, and Colonel Dart would have contributed greatly to the effectiveness of the system and would have relieved inducted civilian specialists of many of their staff duties, which were always time-consuming and which at first were poorly accomplished.

Specific Delegation of Duties to Consultants at Various Levels

The actual operational activities of the consultants, as already mentioned, varied widely at various levels. On the other hand, they overlapped in many particulars and required clarifications and delimitation. The preparation of technical memorandums and directives is an illustration.

Before the Leyte campaign, in October 1944, a number of surgeons prepared technical memorandums calling the attention of medical officers to important professional matters. Thus, the surgeon of the 24th Division, the medical consultant of the Eighth U.S. Army, and the medical consultant, USASOS, all prepared and circulated material relating to schistosomiasis japonica. Later, in June 1945, a TB MED on the same subject was published by the Office of the Surgeon General. Similarly, directives relating to malaria, scrub typhus, amebiasis, infectious hepatitis, and other subjects were circulated from the offices of a number of different surgeons.

In addition to the wasteful duplication and the confusion of conflicting recommendations, this overlapping of function led to misunderstanding between various officers in the consultant system. Cooperation between consultants at different levels on matters pertaining to professional subjects should have been close and clearly understood, as it would have been if their duties at each level had been clearly defined.

Functions Relating to Personnel

The consultants came to play a large part in the evaluation and assignment of professional personnel. This is another function that should have been carefully considered and fully described as part of the standing operating procedure of consultants.

Should the need again arise to call 40,000 or more Reserve or civilian physicians into the Army, it would be wise to obtain the services of a prominent civilian physician to serve as deputy chief of the personnel section in the Office of the Surgeon General. Only in this way could direct, immediate contact be established with the local sources of new personnel to obtain information necessary for the most efficient utilization of these personnel. Direct cooperation between consultant and personnel sections is simple at the army level. At the theater level, it will reflect the system that is in operation in the Office of the Surgeon General. To have the part the consultants are expected to play in the control of professional personnel clearly outlined in a manual or other official publication will do much to eliminate the difficulties in this regard that existed in World War II.

RECOMMENDATIONS

The following recommendations are made with a view to eliminating these and other difficulties and increasing the efficiency of the consultant system:

1. A standing operating procedure should be delineated for wartime consultants separately at the level of each headquarters.

2. Tables of distribution or organization should be authorized for necessary consultant personnel at the level of each headquarters.

3. An assistant consultant or executive officer should be added to the consultant section in higher headquarters, to remain at headquarters and be available to implement the duties and recommendations of the consultant there.

4. The activities of all consultants in a given headquarters should be placed under a deputy surgeon in charge of consultants. This officer should not be burdened by other duties usually handled by the chief of the professional services division.

5. Surgeons of major commands should have a prominent part in the choice of their medical consultants, just as they have in filling other staff positions.

6. Medical, surgical, and neuropsychiatric consultants in the Office of the Surgeon General should combine to help provide each headquarters with a suitable group of consultants capable of cooperating with each other.

7. In time of emergency, in all sections of the Office of the Surgeon General and particularly in the personnel section, a deputy chief should be drawn from nationally prominent and specially trained civilian specialists.

8. Consultants should be rotated from theaters into the Office of the Surgeon General to serve as assistant chiefs of appropriate sections.

9. Consultants in higher headquarters should have as one of their primary duties the assistance of consultants at lower levels by visits to various headquarters and by the maintenance of close communications.

CHAPTER VI

South Pacific Area

Benjamin M. Baker, M.D.

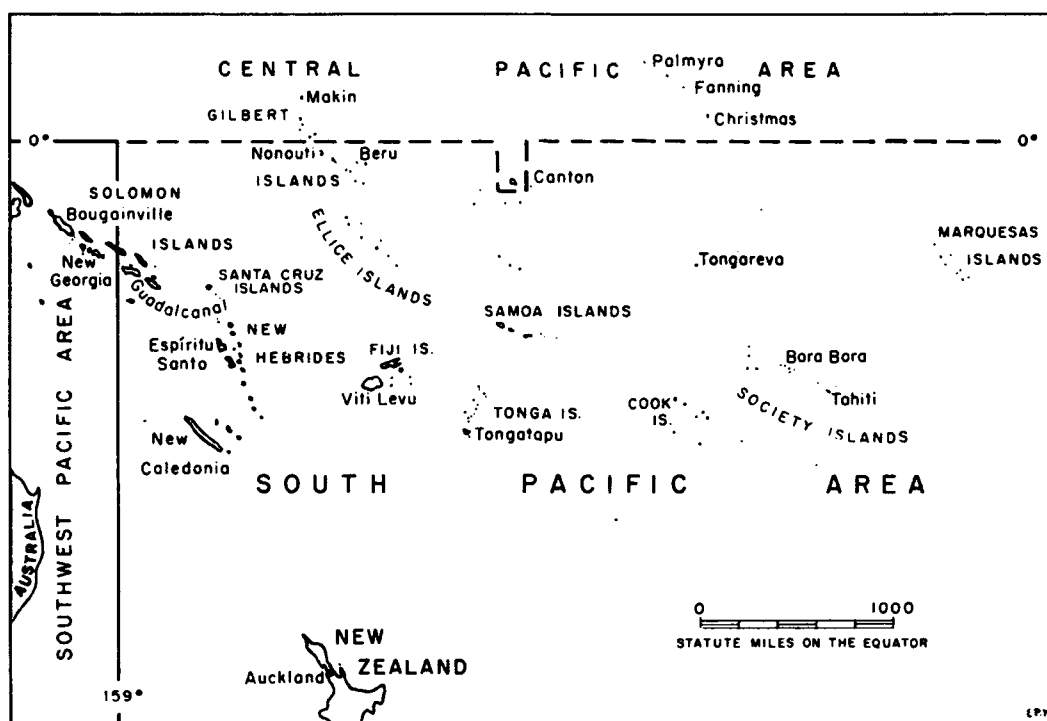
FACTORS IN MEDICAL CARE

The professional care for casualties in the South Pacific was significantly influenced by several factors which at first seem unrelated. No historical account of the medical problems faced on that widespread battlefield would be complete without first considering the influence upon professional practice of a joint Army-Navy command, the meager training given many medical officers for their mission, the vast area in which operations were conducted, and the distribution of diseases in that area.

Human Factors

The training and indoctrination of most medical officers for the various problems they were to encounter was far from ideal and, under the circumstances, understandably so. The demands of the overall military emergency submerged all others, and medical support for oversea tactical and service forces, whether it was adequate or not, had to be provided when those forces were ready to move. There was neither the time nor the organization at unit activation and staging areas in the United States for ascertaining the professional competence of hospital staffs. There was no opportunity to obtain more personnel for those that were deficient nor to transfer personnel from those that had an excess of able men in certain departments. Pertinent military medical intelligence was fragmentary, and the dissemination to professional men of such information as was available at the time was limited for reasons of military security. Consequently, doctors, for the most part only recently recruited from civilian life, were often suddenly confronted on isolated island bases with disease problems that they were ill prepared to meet. Competent professional leadership was often not available. One base with a medical load far exceeding the capacity of its hospitals was staffed with medical officers whose professional qualifications were not up to demands, whereas another had an abundance of specialists who, if they saw the patients at all, were seeing them long after the critical period for the treatment of their disease had passed.

In SPA (South Pacific Area) (map 4), the U.S. Navy was in command over all forces. The Senior Medical Officer, U.S. Pacific Fleet, had the final responsibility in all matters relating to the treatment and prevention of disease.



MAP 4.—South Pacific Area.

Decisions on the deployment of medical installations in the area, the use of supplies, evacuation policies, and actual professional practices were made by Navy command and implemented by island commanders through their surgeons. As a result, the responsibilities of the Senior Medical Officer, U.S. Pacific Fleet, were enormous. Though his cooperation with the U.S. Army in all medical problems was admirable, his organization was small, and medical control was too loose to provide for efficient operation.

There was a shortage of administrative personnel familiar with professional problems and the means for meeting them, which led to a lack of efficiency in the use of medical organizations and personnel. The sick and wounded frequently passed rapidly and repeatedly through a succession of Army and Navy hospitals, and consequently there was little uniformity in professional practice and evacuation policies. It was not until August 1942 that a U.S. Army commander and his surgeon arrived and a start was made in coordinating Army medical activities.

Geographic Factors

Geography had an important influence upon the care of patients in the South Pacific. Troops were stationed on a series of widely separated islands from Bora-Bora and Tongareva to the east of New Zealand in the south and eventually to Bougainville and Emirau Island in the west. Bora-Bora, in the Society Islands, is 3,051 miles from Bougainville, in the Solomons, and 2,545

miles from Auckland, New Zealand. Auckland is 1,127 miles from New Caledonia, 1,598 miles from Espiritu Santo in the New Hebrides, 2,107 miles from Guadalcanal, in the Solomons, and 2,467 miles from Bougainville (fig. 199). The rapid shifting of personnel and hospital equipment from one island to another was always difficult and at times impossible because of a shortage of transportation, and plans for movements of any size had to be made long in advance. As the military situation changed, lines of supply and evacuation routes altered. Unavoidable inefficiency in the use of professional personnel frequently resulted as troop strengths diminished on one island and increased on another. Often, by the time hospitals were constructed and in operation at one location, the military situation had changed to such a degree that they were badly needed in an entirely different area. This led to long, unnecessary, and costly evacuation of patients.

Definitive medical support had to be given to small garrisons on isolated islands when personnel could not be quickly transported to an adequate hospital in the next medical echelon. This frequently led to long periods of relative inactivity for competent medical officers who were badly needed elsewhere.

Distribution of Diseases

In a region so diversified geographically, economically, and socially, there were widely varied disease hazards. In New Zealand, the problems of the internist were similar to those encountered in the Middle Atlantic States, but in the Solomon Islands they were vastly different. New Zealand, New Caledonia, and the Fiji, Cook, Society, and Marquesas Islands were nonmalarious, whereas the New Hebrides and the Solomon Islands were intensely malarious. This epidemiologic peculiarity permitted the transfer of malarialized individuals or whole organizations from intensely malarious areas to areas where the disease did not exist. It made possible valuable research concerning malaria.

Filariasis of the nonperiodic variety was hyperendemic on islands in the eastern portion of the area, and the disease affected large numbers of troops before control measures were instituted. On the islands of the New Hebrides and the Solomons, native reservoirs as well as vectors of filariasis were abundant, but the transmission was periodic, and for reasons that are not altogether clear the disease never became of real military importance. Large epidemics of dengue developed on Espiritu Santo and New Caledonia, and sporadic cases were encountered elsewhere. On all islands, with the exception of New Zealand, troops came into close contact with native populations whose hygienic practices, chiefly those concerned with the disposal of feces, were primitive, and diseases spread by contact with human excreta were common.

The natives of the South Sea Islands were highly susceptible to common contagious diseases such as influenza and measles. In spite of the occasional occurrence of a disease of high communicability in U.S. troops, that no notable epidemic developed is a tribute to Army preventive medicine practices.

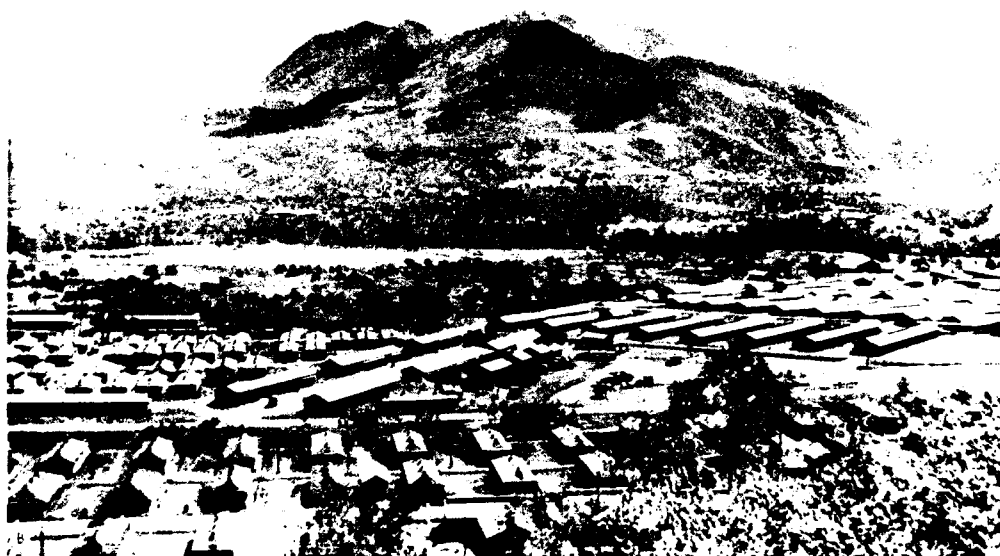


FIGURE 199. Geographic and climatic diversification in the South Pacific Area. A. Jungles of New Georgia Island. B. Temperate New Caledonia, the 8th General Hospital area.

Deployment of Hospitals

From what has been said of geography and the deployment of troops over scattered island bases, it is clear that the chain of medical evacuation and supply was a difficult one (fig. 200). In general, transportation from one island to another could not be effected quickly, and the sick and wounded, whether or not they needed the services of specialists, were often treated by whatever medical officers were available on the spot. Undoubtedly, the Operations Service, Office of the Surgeon General, was greatly limited in its choice of hospitals and individual specialists for specific assignments in the area. It was necessary to send what was available where it was needed most urgently rather than to select, according to a previously well integrated plan, the kinds of units that would best meet specific needs. The same may be said of the redeployment of medical units after they reached the area.

For example, the 7th Evacuation Hospital, a 750-bed affiliated unit from the Post Graduate Hospital of New York City, provided medical support for the force that in April 1942 occupied Tongatabu, 1,808 miles from Guadalcanal where the first combat occurred. The hospital's large complement of surgical specialists was largely surplus in the Tonga Islands, but at Guadalcanal there was no evacuation hospital, and specialists of all sorts were critically needed. A fine installation of cantonment type was constructed at Tongatabu, and the hospital functioned as a station hospital for the small garrison force until early in 1943 when it was moved in two parts to Fiji. There, it was filled to overflowing with station-hospital type cases from a heavily malarialized infantry division, which had been removed to Fiji for rest and rehabilitation. The hospital was moved to Guadalcanal in February 1944 to stage for an operation that was scheduled for April 1944 but was abandoned. Consequently, the 7th Evacuation Hospital never delivered the service for which it was intended until it participated in the invasion of the Philippines in January 1945.

The 52d Evacuation Hospital, an affiliated unit from the University of Pennsylvania Hospital, Philadelphia, Pa., had a somewhat similar experience. This hospital accompanied the task force that occupied New Caledonia without opposition in 1942. It served largely as a station hospital there, although some casualties were received by air and hospital ship from Guadalcanal. When the Americal Division left New Caledonia for combat in the Guadalcanal operation, its sole medical support consisted of the 101st Medical Regiment. The 52d Evacuation Hospital, which was filled to capacity at the time, was left behind.

The 250-bed 71st Station Hospital and two 500-bed general hospitals—the 18th from Johns Hopkins Hospital and the 142d from the University of Maryland—occupied Viti Levu in the Fiji group in June and July 1942 in support of the task and garrison forces (fig. 201). These hospitals received a number of Marine, Navy, and Army casualties from the Guadalcanal and New Georgia operations, but, with air evacuation to Fiji almost negligible, the seriously ill and wounded patients had been treated during their passage through



FIGURE 200. The chain of medical evacuation, New Georgia Island, July 1943. A. Casualties aboard lighter. B. Lighter approaching LST to which patients will be transferred.



FIGURE 201. 112d General Hospital area, Fiji Islands.

higher Army and Navy echelons, and thus the great bulk of work done in the Fiji hospitals was of the routine station hospital variety. Although important investigations on malaria were carried out, a large number of highly qualified specialists in all branches of medicine were relatively inactive, and during this period of inactivity there existed an urgent need for such specialists in all hospitals in the forward area.

Before the opening of the 20th Station Hospital on Guadalcanal in February 1943, the sick and wounded of all Army troops on that island were cared for in provisional hospitals for combat troops, which were not supplemented by specialist teams, or the casualties were evacuated to the rear. The 20th Station Hospital made an outstanding contribution to medical care in the area, but it had neither enough professional personnel nor beds to meet the demands placed upon it. As a result, large-scale evacuation from Guadalcanal was necessary.

CONSULTANT ACTIVITIES AT HEADQUARTERS

In August 1943, Lt. Col. (later Col.) Benjamin M. Baker, MC (fig. 202), Chief, Medical Service, 18th General Hospital, was assigned to the Medical Section, Office of the Chief Surgeon, Headquarters, USAFISPA (U.S. Army Forces in the South Pacific Area). Although Colonel Baker was never officially designated as the consultant in medicine for the area, except in an organiza-



FIGURE 202. Consultants in medicine, South Pacific. A. Col. Benjamin M. Baker, MC, Senior Consultant in Medicine, Office of the Surgeon, USAFISPA; Consultant in Medicine, Office of the Surgeon, USAFPOA; and Consultant in Medicine, Office of the Surgeon, USAFWESPAC.

tional plan of the Chief Surgeon, USAFISPA, he served in this capacity during most of the war in the area and will be referred to in this chapter as the area consultant in medicine.

When Colonel Baker reported for duty, he began at once, through conferences with the Chief Surgeon, USAFISPA, and members of his staff, to familiarize himself more thoroughly with the medical problems confronting internists in the area. One of Colonel Baker's first activities was to inquire into the quality of professional care being given patients with diseases and to advise the Chief Surgeon on corrective procedures indicated. The consultant had authority only insofar as he spoke unofficially for the Chief Surgeon and made recommendations to him. The Chief Surgeon himself was limited in authority by the position of the Medical Department in established Army command and, because the top command in the area was vested in the Navy, the influence of Army Medical Department personnel in establishing and directing medical procedure was further limited.

Colonel Baker was poorly prepared to meet many of the problems that confronted him. His previous military experience was limited, his training in Army administrative procedures negligible, and his viewpoint on military medical matters stemmed from less than a year's service on a single island base. There were many factors affecting the care of patients either directly or in-

FIGURE 202. Continued. B. Col. Edward G. Billings, MC, Consultant in Medicine and Neuropsychiatry, Office of the Surgeon, SPBC; and Consultant in Medicine, Office of the Surgeon, USAFWESPAC.



directly that required study and recommendations for corrective measures. Some of these were of such urgency that they demanded immediate and concentrated attention. The result was that, frequently, more important but less urgent problems were overlooked entirely or had to be neglected until the more urgent ones could be solved. As time went on, it became obvious that the availability and proper employment of qualified professional personnel constituted the difference between good and bad medical care. This concept is axiomatic in civilian practice, but Colonel Baker was slow to realize how much readjustment of personnel in the area was indicated and slow in effecting such changes. Experience proved again that good doctors did good work under conditions that superficially seemed unsurmountable and poor ones did poor work no matter how favorable their surroundings.

Personnel management. The Personnel Section, Office of the Chief Surgeon, Headquarters, USAFISPA, consisted of a Medical Administrative Corps captain who knew little of the professional qualifications of medical officers or of the dependence of sound professional practice upon the availability and proper employment of specialists. The excellent plan eventually worked out in the Office of the Surgeon General for coding medical officers according to their professional qualifications, the MOS (Military Occupational Specialty) rating, and distributing them on the basis of manning tables did not arrive in the South Pacific until too late to be of any value. The common

Army practice of considering its doctors qualified to render practically any professional service was too widespread. The information on personnel records in the Office of the Chief Surgeon, Headquarters, USAFISPA, was not sufficient to inform Colonel Baker as to the real professional qualifications of medical officers. Only after a considerable delay and frequent visits by Colonel Baker to farflung hospitals did it become apparent that there was a startling shortage of well-qualified medical personnel. It was also noted that many able men were lost through normal evacuation, and the qualifications of replacements were often disappointing.

The most outstanding deficiencies of hospital staffs were eventually corrected by the shifting of personnel and the employment of specialists, singly and as teams, on temporary duty. Far too little permanent redistribution was accomplished, however. The Chief Surgeon, USAFISPA, was in an extremely difficult position in regard to personnel matters. He was constantly short of medical officers, especially those with real administrative ability. Island bases were semi-independent, and island commanders, their surgeons, and the commanding officers of their hospitals all too frequently attempted to block the transfer recommended by higher command of highly qualified medical specialists.

A further impediment to the efficient shifting of medical officers was the matter of rank. Promotions of men within hospitals were usually rapid. Promotions often depended more upon length of service, hospital assignment, personal relationships, and the pressure of hospital commanders and island base surgeons than upon professional ability. An incompetent lieutenant colonel who was chief of a medical service could not be replaced by a highly qualified captain assigned to his service, and there were few position vacancies in other installations or headquarters to which incompetent professional officers could be reassigned. Reclassification procedures were almost never employed.

Supply services.—The professional consultants were frequently concerned with matters of supply. On some islands, there were completely equipped hospitals in a well-integrated arrangement. Under these circumstances, there were relatively few major supply problems. What was lacking in one hospital could frequently be obtained in another, or patients could be moved from one to another hospital. The situation was entirely different when large garrison forces had access to only a small station or field installation. The equipment of these units did not enable them to provide all of the laboratory and special examinations required. Therefore, it was necessary to arrange for special issue of supplies and equipment to such hospitals in order to provide the essential requisites for the proper diagnosis and treatment. The lack of supplies was particularly prominent in extremely forward areas where critical shortages seriously interfered with medical care.

Liaison activities.—Colonel Baker frequently visited the surgeons of bases and of tactical units throughout the area. He assisted the base surgeons

along professional lines and served in a liaison capacity between them and the Chief Surgeon, USAFISPA, on matters of personnel, supply, and evacuation. These associations were, in general, mutually helpful to surgeons and Colonel Baker. Though many objections to the ways in which professional consultants operated will appear in the records of medical activities in the South Pacific, there were many favorable reactions to the assistance they gave in improving the quality of medical care. The following extract from a report by a division surgeon speaks favorably of the consultant system:

The recent detailing of consultants to the staff of the Chief Surgeon, USAFISPA, has been a great aid and has given a healthy stimulation to field medical installations. Colonel Oughterson, Colonel Baker and Major Sofield—surgical, medical and orthopedic consultants of General Maxwell's staff—have been ideally suited to their assigned duties. Their visits and discussion, their help and their advice have all been invaluable. They provide the necessary liaison to higher medical echelons and are warmly welcomed by all units. They live with, talk with, and work with the medical officers of all medical installations in the chain of medical evacuation. They bring new ideas, reports of cases evacuated, and in general provide the link that up to their coming had been lacking. Items of equipment have been obtained promptly and efficiently with the help, and even personal delivery, of these officers. All three hold meetings, give most interesting lectures, and are continually seeking new means of improving the Army Medical Service. They have certainly been most helpful and their intelligent, friendly and close approach to the medical officers of this division has been greatly appreciated.

Statistical data evaluation.—The Statistical Section, Office of the Chief Surgeon, Headquarters, USAFISPA, was small. The section consisted of one officer and a varying number of enlisted men, most of whom had little or no specialized training. The officer, a Medical Administrative Corps major, had been a noncommissioned statistical clerk in the Army for many years. At Headquarters, USAFISPA, his primary function was to consolidate the weekly and monthly Statistical Health Reports (Form 86ab) from various bases and medical units. This meant that only a very limited amount of statistical data was available to the professional consultants. It was possible to obtain reasonably accurate information upon broad trends of disease, but more detailed information had to be garnered through other than routine channels.

Accurate statistical reports were obtained in several ways. The Malaria and Epidemic Control Organization in the South Pacific, a joint Army-Navy organization, gathered reliable information by an individual case card system. Through this, the medical consultant was always apprised of the situation concerning malaria. Other data could be collected through special studies and special reports obtained through chiefs of service in the hospitals. The Machine Records Unit, Adjutant General's Section, Headquarters, USAFISPA, was extremely helpful in several special studies, but the amount of time the unit could devote to medical material was greatly limited.

The wealth of important clinical material that was never collected was a constant source of disappointment to those concerned with professional work, but under the circumstances there was nothing that could have been done about it. A sufficiently large machine records unit serving the Medical

Department exclusively would have made it possible to collect a large amount of complete and accurate information.

Preventive medicine interest. In the area, preventive medicine was under the direction of the Malaria and Epidemic Control Organization. Maj. Carlos D. Speck, Jr., MC, a highly qualified malariologist, represented this organization in the Chief Surgeon's Office. He also integrated preventive medicine with other Medical Department activities. The Chief Surgeon, USAFISPA, was represented in the office of the Malaria and Epidemic Control Organization by Lt. Col. (later Col.) Paul A. Harper, MC, who was of great assistance to Colonel Baker in helping him handle professional problems that overlapped into the field of preventive medicine. The efficient management of preventive medicine activities contributed enormously to the discharge of Medical Department responsibilities in the area (fig. 203).

CONSULTANT ACTIVITIES IN THE FIELD

Colonel Baker spent a disproportionate amount of time upon two urgent problems, to the relative neglect of others. These two objectives—to improve the treatment of malaria and to provide adequate medical care in forward and combat areas—were time consuming, and Colonel Baker was often absent from headquarters for long periods. At the same time, there were available in the area internists with excellent professional qualifications who could have been employed as deputy consultants. Some of these men were utilized as instructors, others on special projects and specialist teams, but full advantage was never taken of their abilities. Accordingly, it will be apparent in what follows that undue emphasis had to be placed on certain phases of the consultant's work.

Visits to hospitals.—All hospitals were visited as frequently as time would permit, except those in small and particularly isolated bases. Colonel Baker would report to the commanding officer and discuss medical service problems. The quality of teamwork existing between the medical and surgical services—the two major services in Army hospitals during wartime—could usually be determined by conferring with the two chiefs. Colonel Baker's attendance at ward rounds, disposition board meetings and staff conferences and his examination of clinical and autopsy records enabled him to evaluate the professional qualifications of the chief of the medical service and his staff.

Through these visits, Colonel Baker frequently learned of new problems from both the professional and administrative points of view. It gave him an opportunity to disseminate information he had gathered in other hospitals and to attempt to answer some of the questions that constantly arose in the minds of medical officers, whose outlook was necessarily narrowed by their separation from areawide activities.

Supervision of laboratory services.—For a long time, there was no laboratory consultant in the area, although there was great need for one. The area had a shortage of competent officers and technicians, and the work of the lab-



FIGURE 203. Malaria control on New Georgia Island, October 1944.

oratories required constant supervision by Colonel Baker. During hospital visits, he thoroughly investigated the laboratory and observed technical procedures. He had to learn essential techniques himself and spent much time teaching where deficiencies were found.

The Malaria and Epidemic Control Organization operated excellent schools at various bases to which technicians could be sent for instruction in parasitologic techniques. As a result, the quality of malaria diagnosis greatly improved.

It would often happen that certain tests were done well in one hospital and poorly in another. Technicians and instructors had to be shifted about on a temporary duty status to fill gaps and undergo periods of instruction, and Colonel Baker had to ascertain the needs of any given hospital and take necessary corrective steps. Teams of officers and enlisted men were occasionally moved from one base to another for the purpose of conducting special investigations, and the services of these men were utilized in providing specialized instruction.

Laboratory service was distressingly inadequate in the forward areas of Guadalcanal (fig. 204), the Russell Islands, New Georgia, and Bougainville. South of Guadalcanal, there were general hospitals with well-trained laboratory staffs. Evacuation of patients was frequently necessary simply for the

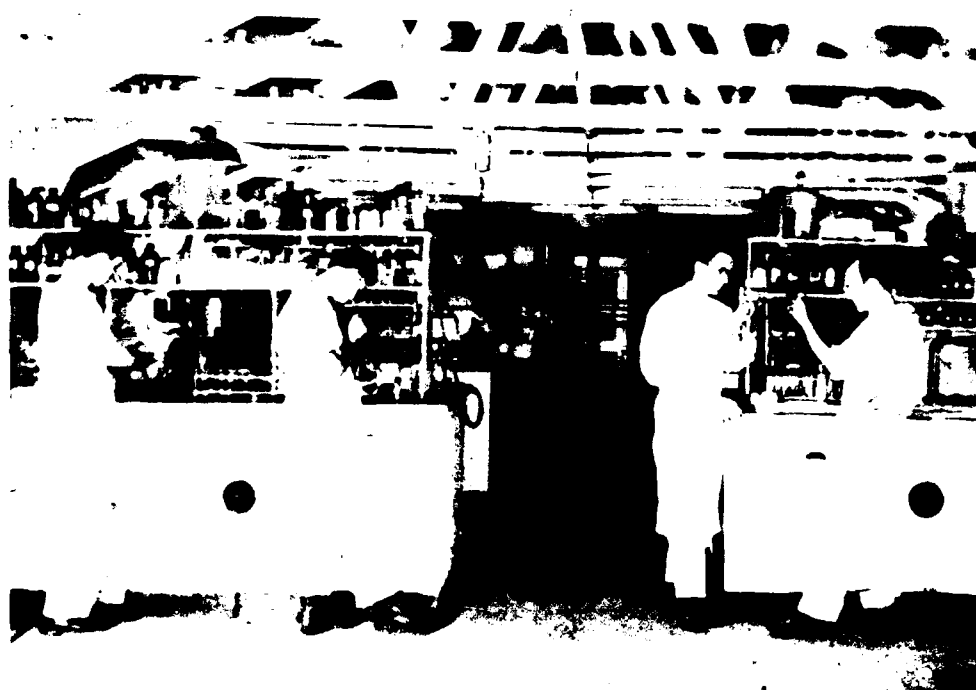


FIGURE 201. Laboratory, 18th Station Hospital, Guadalcanal, December 1944.

purpose of obtaining laboratory examinations. When the 6th Medical Laboratory arrived in the area in 1944, it was sent to Guadalcanal. To this, the only Army laboratory in the area, was assigned the task of supervising and assisting all laboratories in the forward area. A memorandum describing the service and establishing a standard procedure was prepared and circulated to all hospitals in the Solomon Islands. This memorandum clearly defined what examinations the laboratory could provide and the means of collecting, packaging, and shipping specimens.

The Commanding Officer, 6th Medical Laboratory, was appointed laboratory consultant for the forward area, in addition to his other duties. He, or his representative, made routine visits to hospital laboratories for the purposes of studying their needs, instructing personnel in laboratory procedures, and determining what supplies, special solutions, and mediums were lacking that could be provided by his unit. Teams from the 6th Medical Laboratory were occasionally sent to various bases in the forward area to help hospital laboratories that were particularly overworked and to assist in special investigations of unusual problems.

Nevertheless, in early operations, many patients received inadequate laboratory examinations or were evacuated far to the rear to have relatively simple tests made. The professional consultants were convinced that a laboratory in the combat zone was badly needed to provide reliable examinations of the blood, urine, and feces and to make appropriate tests in cases suspected of gas gangrene, diphtheria, dysentery, and rickettsial diseases. Capt. Max

Michael, Jr., MC, of the laboratory service of the 18th General Hospital was selected to organize such a provisional laboratory.

The work of this officer contributed inestimably to the high quality of medical care given the sick and wounded in the Bougainville operation. The medical service for this landing was organized under great pressure. It took considerable imagination and ingenuity to select, procure, package, and transport essential laboratory supplies. The laboratory went in with the second echelon of Army troops, and much of its equipment was scattered in the confusion of the invasion beachhead. However, Captain Michael managed to collect his equipment and established his laboratory with surprising speed (fig. 205). Soon after its establishment, the hospital changed its location, but this was accomplished with remarkably little interruption in the laboratory service. All essential examinations were provided under the difficult conditions of combat. "The Pasteur Institute, Bougainville Branch," was stamped as an unqualified success (fig. 206).

Teaching.—The dissemination of information that would assist medical officers in giving the best possible care to the sick was one of Colonel Baker's chief objectives. Various means were used to accomplish this, but the principal method was through personal contact. Opportunities were provided during general ward rounds, by consultation on special cases, by observation and teaching of laboratory procedures, and by participation in staff conferences during hospital visits. Colonel Baker carried with him a projector and a number of slides of educational value. Regular hospital staff meetings were supplemented by scheduled meetings attended by all medical officers on a given base. Special meetings were organized whenever circumstances permitted, and a symposium was held whenever special subjects required additional attention in a certain area.

Visits to field units.—Colonel Baker made a special point of regularly visiting the medical battalions of all divisions in the area. He met with their medical officers, held conferences, and attempted more effectively to integrate the activities of field medical officers with those of hospital staffs. Officers or enlisted technicians of field units who needed special instruction were often placed on temporary duty in an installation that had personnel qualified to teach.

A serious cause of dissatisfaction among medical officers of field units was their feeling that in some ways, men assigned to hospitals were favored. There can be no question that this objection was a valid one, and the consultants realized the hardships imposed by inflexible assignments. In the South Pacific, a sustained effort was made to make some amends to field medical officers by the creation of as many educational opportunities as conditions would permit. An area directive set up regular programs of instruction and provided for limited rotation of officers through fixed hospitals for purposes of specialized instruction.

Distribution and preparation of medical literature.—Early in the war, hospitals were seriously short of medical books and journals. In some affiliated



FIGURE 205. Capt. Max Michael, MC, kneeling at left, showing his underground incubator on Boumaixville.

units, this deficiency had been corrected before leaving the United States by assembling libraries and arranging for the mailing of journals. As time went on, supplies of books and journals became more plentiful, and the system of distribution worked admirably. The consultants constantly attempted to obtain through regular and personal channels whatever technical literature was needed by hospital staffs.

TB MED's (War Department technical bulletins, medical) and other publications dealing with medical procedure went through command channels, and distribution was poor. Consultants often heard high praise for the quality of the TB MED's, and it was most unfortunate that the time and ability put into their preparation was partly wasted because of their failure to reach the officers for whom they were written. Colonel Baker always received advance copies of these publications from the Medical Consultants Division in the Office of the Surgeon General. He carried these from hospital to hospital so that at least the chiefs of service could see them and pass on to their staffs the substance of the bulletins.

The system of distribution broke down at several points. It was not unusual to find publications in the files of commanding officers of hospitals



FIGURE 206. "Private Assistant, Bougainville Branch." This photograph shows that American troops were still active among the fighting men of the U.S. Army on Bougainville.

that had never reached the professional staff. It would have been better to distribute technical publications through medical channels, preferably to individual officers directly. This was done most successfully with the *Bulletin of the U.S. Army Medical Department*.

The Chief Surgeon, USAFISPA, distributed through medical channels a number of circular letters dealing with professional problems, hospitalization and evacuation policies, and the conservation of manpower and medical supplies. The professional consultants prepared the circulars dealing with professional practice, and these received wide distribution. Colonel Baker prepared circulars on the treatment of malaria, the use of Atabrine (quinacrine hydrochloride) as a malaria suppressive, Atabrine metabolism, pharyngeal and cutaneous diphtheria, hookworm infestation, eosinophilia, and scrub typhus. He collaborated with the surgical consultant in preparing circulars on the use of penicillin, the sulfonamides, and the management of common dermatologic conditions.

Reports. Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine to The Surgeon General of the Army, and his staff were highly efficient in their communication of informational material to the medical consultant in the South Pacific. This kept the area consultant abreast of developments at home and in other operational theaters. The bulletins of the National Research

Council reached him regularly. They were an important source of information and often helped to clarify subjects under discussion or investigation within the area.

Colonel Baker was responsible for preparing portions of reports that dealt with the diagnosis and treatment of disease. Basic information was gathered by personal contact with medical officers and by study of regular monthly ETMD (Essential Technical Medical Data) reports from the bases, but the system of reporting was deficient in an important respect. The separate reports of several hospitals located on one base would be consolidated in the base surgeon's office and forwarded to area headquarters. Colonel Baker had no regular opportunity to see these individual hospital reports, and much valuable material was lost in the consolidation process, in addition to time and effort.

When Colonel Baker was away from headquarters, the many reports that arrived created a large backlog. Command reports on medical topics often had to be prepared hurriedly when they would have been made more valuable had there been more time to devote to their preparation. The same comment applies to Colonel Baker's educational activities and general correspondence with chiefs of service in hospitals. The professional consultants discussed frequently the desirability of having a publications officer in the Chief Surgeon's Office; but the plan was never pursued to completion. This plan would have resulted in more efficient dissemination of valuable technical information.

Research projects. One of Colonel Baker's duties was to develop research projects, to advise the Chief Surgeon, USAFISPA, of their practical application, and to keep The Surgeon General informed of results that might have application to medical practice elsewhere than in the South Pacific.

This chapter will include a summary of some of the more important research projects related to internal medicine in the area (p. 607).

MEDICINE IN THE FORWARD AREA

Soon after his assignment as medical consultant, Colonel Baker made brief visits to the four 500-bed station hospitals on New Caledonia. All of these hospitals were crowded with patients who had been admitted directly from the garrison force or by evacuation from the forward area. Medical problems were primarily similar to those with which the Consultant had become familiar in the previous 11 months in a general hospital at Fiji. The visits to New Caledonia strengthened his conviction that too many patients were evacuated from forward areas. A constant stream of patients flowed to the rear, pausing but briefly at one medical installation after another because the number of beds was insufficient to hold them.

New Georgia Operations

At Munda, on New Georgia Island in the Solomons, where combat was just ending, professional problems were studied with the help of the Surgeon,

XIV Corps. The greater part of three divisions had been employed in the combat operations. Hospitalization had been provided by the clearing companies of the three divisions augmented by one platoon of a field hospital and a small convalescent facility organized by the 37th Infantry Division. These hospitals were quite unable to provide adequate medical care for the large number of casualties. Not only were the physical facilities inadequate but also the professional qualifications of Medical Corps personnel assigned there were not equal to the difficult professional service demanded by the situation.

Disease casualties were very numerous, consisting chiefly of patients with diarrheal diseases, infectious hepatitis, exhaustion states, anxiety and panic states, malaria, and common tropical dermatoses. Because of the shortage of beds, there was no alternative to rapid evacuation to the rear on a distressingly large scale (fig. 207). Guadalcanal was the next base in the evacuation chain, but hospital accommodations there were quickly filled beyond maximum capacity, and further evacuation, first to Espiritu Santo in the New Hebrides, then to New Caledonia, to Fiji, and finally even to New Zealand was the inescapable result.

Conferences with hospital staffs throughout the rear area brought to light certain highly significant facts. In general, the most seriously ill patients could not initially be moved. They were hospitalized in the forward area, although the shortages of physical facilities and qualified professional personnel were greatest there (fig. 208). When those patients finally arrived at rear area hospitals where specialist talent was concentrated, they had usually reached the convalescent stage of their illness or were simply to be moved on to the United States. The vast majority of patients evacuated early were those with disease conditions that did not warrant their evacuation, except in the sense that they were physically fit to travel. They were consequently moved from one hospital to another in an effort to keep hospital beds available in the combat zone.

When the records of hospitals in rear areas were examined later, it was found that time after time patients arrived who had largely, if not entirely, recovered from the illnesses that had originally led to their evacuation. This practice used transportation facilities and hospital beds uneconomically, caused much duplication in the use of medical personnel, and was detrimental to preserving the combat effectiveness of troops who were urgently needed.

An illustration of this unfortunate practice can be found in tracing the course of two hypothetical soldiers admitted from combat to a hospital at Munda for the treatment of exhaustion and diarrhea. One was retained in a clearing station on New Georgia. After several days of rest, feeding, hydration, and symptomatic treatment, he was returned to his organization no less fit, physically or psychologically, than one of his fellows who had patiently accepted his fatigue and diarrhea and recovered while remaining on duty. The second, evacuated because of the shortage of beds, eventually ended up in a hospital in New Zealand, although he had recovered from his fatigue,



FIGURE 207. Transfer of wounded from Higgins boat to Navy seaplane, Rendova Island, Solomon Islands, 4 July 1943.

hunger, and diarrhea a day or two out of Guadalcanal in the clean, comfortable, and secure surroundings of a hospital ship.

The psychologic effect upon a high percentage of soldiers who had similar experiences is inescapable. The difficulty with which they could be returned to duty in the forward area was roughly proportional to the distance they had been evacuated.

A newly appointed surgical consultant reached a similar conclusion after a 1-month tour of the forward area. Urgent measures were deemed necessary to improve the inadequate professional care being given surgical patients in combat zones.

Bougainville Campaign

A study of corrective measures was immediately undertaken by the Chief Surgeon, USAFISPA, with the help of the professional consultants. Steps had already been taken to alleviate the situation partially. A large general hospital and a 250-bed station hospital were routed to Espiritu Santo, two 500-bed station hospitals were in the process of construction at Guadalcanal, and an additional field hospital was being sent to Munda. The consultants strongly urged the movement of one of the general hospitals from Fiji to Guadalcanal, but this move was prevented by administrative objections.

The analysis of the New Georgia operation showed that inadequate



FIGURE 208. Forward area medical treatment facilities in the Solomon Islands. A. 13d Division Clearing Station, Rendova Island, 13 July 1943. B. 25th Division Clearing Station, New Georgia Island, 15 October 1943.

medical support was common in the combat area. Efforts were made at once to avoid a similar difficulty during the pending campaign on Bougainville.

A task force composed mainly of the 3d Marine and 37th Infantry Divisions was scheduled to assault the Empress Augusta Bay area of Bougainville on 1 November 1943. This bold plan involved bypassing two strong Japanese bases directly in the line of evacuation. With this plan in mind, the professional consultants urged that a field and evacuation hospital be landed soon after the assault, instead of later in the operation as called for in the landing schedule. The Chief Surgeon, USAFISPA, was in entire accord with this recommendation, but troop lists and shipping allowances were already firm, and the responsible command was not sympathetic to altering them.

The time was short, and compensation for the lack of hospitals had to be improvised quickly. A plan to bolster the deficient medical support was formulated by the Chief Surgeon, USAFISPA, with the aid of the medical and surgical consultants. It was presented directly to Lt. Gen. Millard Harmon, Commanding General, USAFISPA, Maj. Gen. Robert G. Breene, Commanding General, Services of Supply, and subsequently to Maj. Gen. Robert S. Beightler, Commanding General, 37th Infantry Division. The plan presented in detail the deficiencies of the medical support in Guadalcanal and New Georgia, the anticipated saving in manpower and improvement in morale of troops, and the increased treatment possible for sick and wounded.

The plan received the complete approval and support of the high command, as did many future suggestions from the Chief Surgeon, USAFISPA, on behalf of the professional consultants. Administrative corners were cut, permitting the rapid collection of additional medical, quartermaster, and engineering supplies. A high priority was obtained for the transportation of additional specialists and the assignment of personnel and supplies to scattered units of the 37th Infantry Division.

Sufficient supplies were obtained to expand the clearing station to a facility with a 1,000-patient capacity. Great care was exercised in the selection of these supplies in order to provide for definitive treatment for all surgical, medical, and psychiatric casualties who could be returned to duty within a period of 30 days.

The necessary personnel were obtained by the transfer to the 37th Infantry Division of officers and enlisted men of the 52d Field Hospital. This hospital had been scheduled to arrive at Bougainville on approximately D-plus-45 day. Medical, surgical, psychiatric, and laboratory teams were selected from the 18th General Hospital, 142d General Hospital, Fiji, and 39th General Hospital, Auckland, New Zealand, and from the 25th Evacuation Hospital. These men were assigned to the 112th Medical Battalion and were distributed among component units.

The 37th Division had fought in New Georgia. Although it had contributed less than its share of nonbattle casualties and was justly proud of its medical record, the evacuations of personnel had been unavoidably great. A certain evacuation tradition had developed in the division, as well as in all

South Pacific troops who had been in combat with inadequate medical support. It was thought that an open discussion of this with the division's medical and line officers might help to foster a healthier attitude.

A series of indoctrination talks on contemplated changes in dealing with the sick and wounded at Bougainville was given by Colonel Baker to small groups of both commissioned and noncommissioned officers. The background of medical service in the area was clearly and frankly described. The reasons for the shortage of medical support in previous operations were outlined. It was pointed out that a precedent had been established which led soldiers to believe they would be evacuated quickly from the combat zone to the comparative comfort and safety of a rear area hospital if they became casualties. It was emphasized that this practice seriously reduced combat efficiency by unnecessary loss of manpower and frequently jeopardized the future health and well-being of casualties.

Line officers were informed of some details of the medical plan, such as the provision of an adequate number of hospital beds to take care of expected casualties within the combat area and the presence of teams of medical officers qualified in all important specialist categories. The advantage to serious casualties of having the best possible definitive care readily available in the combat zone was strongly emphasized.

Line officers were urged to consider the merits of the plan and explain it to their men. It was pointed out that confidence could be built up in troops by assuring them that the best medical care in the area was to be provided for them on the spot, not days later in hospitals hundreds of miles away. The chief causes of medical and psychiatric problems during combat were reviewed, together with the indispensable role that line officers play in the control of disease conditions such as malaria, diarrhea, dermatitis, and psychiatric disorders.

The consultants, the assembled specialists, and the permanently assigned medical officers of the task force held frequent conferences concerning supply, professional procedures, the distribution of specialists among units, and the administrative and operational control of all anticipated medical activities.

The initial assault and establishment of a small beachhead on Bougainville was made by the 3d Marine Division. Six days later the first echelon of the 37th Infantry Division arrived and began to extend the beachhead.

The tactical situation had an important effect on the kinds and numbers of medical problems encountered. The objective of the operation was to take and defend an area in which airfields could be constructed. The locality had not been occupied recently in any numbers by either Japanese or natives. As the perimeter of the defense was extended (fig. 209), the natives, who had originally scattered to the hills, began to seek the security of U.S. lines. Large patrols sortied well beyond perimeter limits, and communicable disease rates began to rise (fig. 210).

During the initial phase, neither disease nor battle casualties were great, and the demand for hospitalization was slight. Recurrent malaria, upper



FIGURE 209. Troops of the 37th Division pushing vehicle stalled in the muddy roads, Bougainville, 9 November 1943.

respiratory infections, diarrhea, dermatitis, and exhaustion and panic states were the common disease problems. Cases of pharyngeal and cutaneous diphtheria appeared sporadically. Excellent laboratory and X-ray services provided necessary diagnostic aid preventing many unnecessary evacuations, and the general care of medical disease casualties was considered highly satisfactory.

Excellent cooperation was established between the division personnel section and the medical service. As a result, convalescent patients were expeditiously reassigned within the division to duties commensurate with their physical and psychologic limitations (fig. 211). Conservation of manpower was far beyond expectations because of ready reassignment and surprisingly few evacuations for medical and psychiatric disease. An overall statistical account of disease casualties and evacuations in the operation is given later (p. 598).

Plans for Assault on Kavieng

An assault upon the Kavieng area of New Ireland in the Bismarck Archipelago by a task force composed of the 3d Marine and 10th Infantry Divisions was scheduled for 1 April 1944. It was again necessary for the consultants to improvise medical support because a field and an evacuation hospital would



FIGURE 210. Patrol, about 25 miles toward the American lines. This patrol operated 13 days and covered 65 miles, Bougainville, December 1941.

not accompany the assault force and it was estimated that casualties would be unusually heavy. The lessons learned at Bougainville enabled the consultants to formulate a similar, but greatly expanded, plan for the assault on Kavieng. Teams of specialists were assembled at the Guadalcanal staging area, and assault transports were partially loaded, when the operation was abandoned.

DIAGNOSTIC DIFFICULTIES

Both physicians and patients were subjected to strange and unfamiliar conditions which influenced the practice of medicine in the South Pacific. In civilian practice, doctors learn that one diagnosis generally suffices to explain clinical problems. In the Pacific, the reverse was true. More often than not symptoms indicated a combination of diseases. Many medical officers failed to give adequate attention to the probability that more than one diagnosis was necessary to fit together such groups of symptoms.

Common Confusions

Malaria was the most common partner in such compound diseases. Often, an acute respiratory infection, an attack of dysentery, or a surgical condition



FIGURE 211. Ward tents, casual convalescent company, Bougainville, 17 December 1943.

reactivated latent malaria and led to confusion in diagnosis. Such perplexities were most common early in the war when it was not generally realized that repeated search for malaria parasites in all febrile conditions was a necessary diagnostic precaution.

Observers who possessed training in trustworthy laboratory techniques were not numerous at the time. Gradually, as more experience was acquired by hospital staffs and the great frequency of malaria became apparent, the disease was more universally suspected. As time passed, reliable measures to exclude it as a contributing factor in difficult diagnostic problems were more commonly and efficiently employed.

Both dengue and infectious hepatitis were frequently accompanied by malaria. Hepatitis caused particular concern because textbook descriptions of jaundice in malaria and a constant fear of the hepatotoxic effect of Atabrine combined to confuse medical officers in the proper interpretation of jaundice. The treatment of hepatitis by antimalarial drugs was rarely if ever harmful to patients, but fear of the significance of jaundice added to the general confusion surrounding the treatment and suppression of malaria.

The combination of eosinophilia, light hookworm infestation, and any one of a variety of common medical conditions in a single patient was often encountered among combat troops. This resulted in confusion in the inter-

pretation of vague symptoms, and many patients were treated for hookworm disease when their symptoms were caused by something else. The difficulty of demonstrating hookworm ova in light infestations and the stubborn response to therapy lead to further diagnostic difficulty.

"Disease awareness," a diagnostic pitfall whenever disease occurs in epidemic proportions, was common in the Pacific. This awareness is a good guide to diagnosis, but it can lead to serious errors when followed too far. Common diarrheas were so universal soon after the landings on nearly all islands that carriers of bacillary dysentery were often unwittingly discharged to duty and many cases of amebiasis were overlooked because adequate laboratories were lacking. Most febrile diseases were quickly called malaria without laboratory confirmation and were treated as such. This caused considerable harm to the patient in those cases when wounds of the head, cerebral hemorrhage, or meningitis were treated as cerebral malaria. The reverse was also the case, as examples were discovered proving that death from cerebral malaria too often resulted after a faulty diagnosis which delayed the use of antimalaria therapy until it was too late.

Psychologic Factors

Frustration, maladjustment, malassignment, nostalgia, and monotony had a profound effect upon the acceptance by the soldier of his military fate (fig. 212). It is undeniable that these psychologically deteriorating influences were unusually intense on Pacific islands. The islands were isolated, living conditions were bad, food was monotonous, recreational facilities scarce, climatic condition oppressive, and there was an abundance of strange diseases which could result in permanent ill health (fig. 213). The universal use of Atabrine gave men a sickly and repulsive complexion. There was a general loss of weight, frequently of alarming proportions, as well as dermatologic conditions that stubbornly resisted therapy. Patients with malaria, dysentery, a battle wound, or infectious hepatitis presented usually more difficult emotional problems than they would have done in the civilian practice of medicine.

The psychologic reaction of soldiers to strange diseases was particularly troublesome in cases of filariasis and malaria. Medical officers themselves were uncertain of the course these diseases would take and frequently made contradictory statements regarding them. Since patients, soldiers or line officers, frequently regarded any medical officer's opinion as authoritative, they were often ill-informed and unjustifiably afraid of their illnesses. The natural consequence was emotional reactions leading to exaggeration of the symptoms of organic disease, the creation of fanciful ones, invalidism, prolongation of hospitalization, and loss of men for oversea service by evacuation.

An important insight into the psychologic reactions of soldiers to their environment, their military experiences, and their diseases was shown through an inquiry into the attitude of infantry soldiers who were presumably in good health and on duty at the time. Veterans of an infantry division that had



FIGURE 212. Psychological effects of island warfare seen on the weary and harassed face of one American soldier, New Georgia Island, July 1943.

been in Guadalcanal and New Georgia for approximately 11 months were questioned regarding their general health. The questioning took place after a rest and recuperation period of several months in a favorable climate, where living and recreational conditions were good, and after a number of the men had been hospitalized in an Army hospital. The men were asked: "In general, what sort of physical condition would you say you are in at the present time?" They answered as follows: Physical condition very good, 2 percent; good, 4 percent; fair, 34 percent; poor, 41 percent; and very poor, 19 percent. Of the total group, 70 percent said they had been in sufficiently good condition to engage in their initial combat, but only 39 percent felt that they were ready to return.

This information provides an enlightening background for study of the high percentage of psychoneuroses among hospitalized patients in the South



FIGURE 213. These men wash up in jungle waters after a four-day march, New Georgia Island.

Pacific. A large number of men were ready for a psychiatric label before they were hospitalized. It was difficult to return these patients to duty because they knew that hospitalization protected them and, if they were hospitalized long enough, in accordance with evacuation policy they would be returned to the United States.

In civilian life, the average doctor deals with the minor emotional difficulties of his patients. In the Army, the ready availability of psychiatric service made it altogether too simple for the doctor not to treat components of patients' illnesses in which he had no professional interest. The term "psychoneurosis" became a diagnostic pigeonhole often used when medical officers were tired of struggling with complaining patients. There was always a shortage of psychiatrists in the South Pacific, and the medical consultant had to make a constant effort to keep internists from passing on to psychiatrists simple behavior problems which the internists themselves should have handled.

Disease Patterns

The general pattern of disease in oversea hospitals was similar throughout the world. The notable exceptions that did exist were caused by epidemiologic peculiarities of specific localities. In the South Pacific, serious respiratory

diseases were uncommon. Acute rheumatic fever, hemorrhagic nephritis, and other diseases associated with virulent hemolytic streptococcal infections were rare.

Though large geographically, the South Pacific Area contained a comparatively small number of troops. No more than six combat divisions were ever in the area at one time. The incidence of malaria was high in the first four divisions to arrive in the theater, but by early 1944 mosquito control had greatly deterred malaria transmission.

MORBIDITY STATISTICS ¹

Data from the official statistical records have been analyzed to show the incidence of disease in the South Pacific under varying conditions of medical care.

Malaria and other causes of evacuation, 1943.—The havoc wrought by malaria in the South Pacific is strikingly illustrated by the following figures: In 1943, as the area strength increased from 110,000 to 176,000 there were 151,577 patients admitted to hospitals. Of these, 60,000 were treated for malaria. The number of available hospital beds increased from 4,200 in January to 14,815 in December 1943. Some 22,265 patients, more than 14 percent of those hospitalized, were evacuated to the United States. The breakdown of the classes of ailments that caused evacuation and the percent of total cases were as follows: Neuropsychiatric disorders, 28.45; malaria, 14.97; gunshot wounds, 7.06; gastrointestinal disturbances, 4.88; skin diseases, 3.67; filariasis, 1.98; jaundice, .85; and other, 38.14.

Disease casualties on Guadalcanal, November 1942.—The only hospitalization available during the critical phase of Army operations in Guadalcanal was that provided by three provisional field hospitals of the 101st Medical Regiment of the Americal Division. These hospitals were later aided by the clearing company of the 25th Infantry Division. The hospital staffs were not augmented by specialist teams. A breakdown of disease casualties in these field hospitals between late November 1942 and mid-February 1943 is as follows:

<i>Diagnoses</i>	<i>Number of admissions</i>
Malaria.....	3,102
Psychiatric conditions.....	483
Enteritis.....	416
Cellulitis.....	411
Fever, undetermined origin.....	343
Upper respiratory infection.....	302
Jaundice.....	248
Skin disease.....	234
Otitis media.....	227

¹ Statistics presented in this section are the author's compilations and interpretations of data in official statistical South Pacific Area records.

<i>Diagnoses</i>	<i>Number of admissions</i>
Heat exhaustion.....	141
Hepatitis, unclassified.....	96
Tonsillitis.....	87
Urethritis.....	54
Arthritis.....	35
Asthma.....	27
Epidermophytoses.....	24
Peptic ulcer.....	20
Hemorrhoids.....	14
Cardiac conditions.....	13
Scorpion bites.....	9
Amebic dysentery.....	7
Sinusitis.....	6
Pneumonia.....	2
Mumps.....	1
Other, unclassified.....	34
Total.....	6, 336

Diagnoses and disposition on Bougainville, November 1943.—The situation was vastly different during the Bougainville operation. Only one Army division was committed during the early phase, combat was much less intense, and preventive medicine was of a high order. The provisional hospital was competently staffed with specialist teams and had an excellent laboratory. There were just under 1,000 admissions during the initial 6 weeks of combat. Medical service patients on 24 November 1943 had the following diagnoses:

<i>Diagnoses</i>	<i>Number of cases</i>
Dermatologic diseases.....	29
Nasopharyngitis.....	22
Diarrhea.....	15
Psychiatric conditions.....	15
Eye and ear infections.....	12
Malaria.....	10
Asthma.....	9
Unexplained fever.....	6
Arthritis.....	6
Other.....	20
Total.....	144

It had been decided that patients would not be evacuated if it was likely they could return to duty within 30 days. During the first month of combat, only 22 patients with medical or psychiatric disease were moved to the rear.

Diagnoses and disposition on Guadalcanal, February 1944.—In February 1944, there were three 500-bed station hospitals in operation on Guadalcanal. The average daily census for one of these was 478, with a total of 845 cases

being processed through the hospital during the month. These cases were broken down as follows:

<i>Types of disorders</i>	<i>Cases processed</i>	
	<i>Number</i>	<i>Percent of total</i>
Neuropsychiatric disorders.....	118	14
Respiratory diseases.....	101	12
Internal medicine.....	60	8
Malaria.....	59	8
Gastrointestinal disorders.....	49	6
Dermatologic disorders.....	49	6
Others.....	409	46
Total.....	845	100

There was a 30-day evacuation policy on Guadalcanal at the time. Of the 845 patients processed, 62 percent were discharged to duty and the remainder were evacuated to hospitals at Espiritu Santo, Fiji, New Caledonia, and New Zealand for further treatment (fig. 214). No deaths from medical conditions occurred during the month.

A further breakdown of these cases reveals the following diagnoses and dispositions, with those not evacuated being discharged to duty:

<i>Diagnoses</i>	<i>Number of cases</i>	
	<i>Treated</i>	<i>Evacuated</i>
Malaria.....	59	11
Nasopharyngitis.....	41	0
Bronchitis.....	24	2
Jaundice.....	20	0
Asthma.....	19	16
Gastroenteritis.....	17	5
Cardiovascular disease.....	14	13
Diarrhea.....	12	0
Peptic ulcer.....	10	10
Spastic colitis.....	7	1
Neurocirculatory asthenia.....	6	3
Pneumonia.....	6	0
Fever of undetermined origin.....	3	0
Filariasis.....	2	2
Pleurisy.....	2	0
Hyperthyroidism.....	2	2
Miscellaneous.....	25	5
Total.....	269	70

Troops in New Zealand, 1943.—A different impression of the incidence of disease was reported in the area ETMD for January 1944, in a study of hospitalization of personnel in the 25th Infantry Division, which had been removed to an area favorable for rest and recuperation. This combat division was moved to New Zealand in November and December 1943 after approximately



FIGURE 214. 9th Station Hospital, New Caledonia, September 1943.

11 months forward-area service in both the Guadalcanal and New Georgia operations. The division was ordered to take 0.6 gm. Atabrine weekly as a malaria suppressive, though this did not prevent the development of a considerable number of cases of the disease.

All patients who could not be treated upon a quarters status were admitted to the 39th General Hospital in Auckland. The following analysis deals with the first 1,000 nonsurgical patients admitted. In addition to a history and general physical examination, each man was given a thick blood-film examination, a complete blood count, a urinalysis, an X-ray of the chest, and a stool examination if he complained of diarrhea or had an eosinophilia in excess of 10 percent. There were 55 admissions for contagious diseases with the following breakdown:

<i>Diseases</i>	<i>Number of cases</i>
Cutaneous diphtheria	22
Streptococcal pharyngitis	12
Diarrhea:	
Cause undetermined	1
Amoebiasis	2
	6
Pneumonia	4
Pharyngeal diphtheria	3

<i>Diseases</i>	<i>Number of cases</i>
Nasal diphtheria.....	2
Diphtheria carrier.....	2
Influenza.....	2
Chickenpox.....	1
Gonorrhea.....	1
Total.....	55

Of the 700 patients admitted as malaria suspects, 564 were found to have positive blood smears and were given antimalaria therapy. The parasite species found in these cases were as follows: *Plasmodium vivax*, 541 cases; *P. falciparum*, 15 cases; mixed, 1 case; and undetermined, 7 cases.

Hookworm ova were found in stool specimens from 88 patients and *Strongyloides* in 5. In 68 men, ova were found on the first stool examination, while from 2 to 5 examinations were necessary for the remaining 25. The first stool examination was negative for hookworm ova in 67 men who had eosinophilia greater than 10 percent. Of the 1,000 men in this series, 23 percent had eosinophilia greater than 8 percent.

The incidence of anemia was remarkably low. Of the 93 men with hookworm or *Strongyloides* ova in their stools, 20 percent had red blood cell counts below 4 million, and 34 percent had hemoglobin values below 80 percent. On the other hand, of 907 men without helminthiasis, 15 percent had red blood cell counts below 4 million, and 37 percent hemoglobin values below 80 percent. The lowest red blood cell count was 3.1 million, and the lowest hemoglobin percentage was 60.

The urine examinations were essentially normal except in one case of chronic nephritis and one case of diabetes mellitus.

Among the 1,000 men, 22 had cutaneous diphtheria, which accounted for, roughly, one-third of all admissions for dermatologic disease.

Chest X-rays of the 1,000 men revealed the following diagnoses:

<i>Diagnoses</i>	<i>Number of cases</i>
Ghon focus.....	45
Primary complex.....	36
Diaphragmatic adhesions.....	16
Pneumonia.....	16
Calcified nodules.....	14
Pulmonary tuberculosis.....	7
Scoliosis.....	3
Cystic disease.....	2
Thoracotomy.....	1
Miscellaneous.....	11
Total.....	151

Causes of death from disease 1942-44. --An attempt was made to obtain information concerning the causes of death from disease in the South Pacific between 1 September 1942 and 31 August 1944. No claim can be made that the figures compiled are entirely accurate, but they are the closest approximation that can be made under the circumstances since complete records were never available for study. A number of deaths occurred on Navy hospital ships, in Navy hospitals, and in small Army hospitals in the forward areas, and data on these patients that could be thoroughly analyzed were never available. Colonel Baker reviewed the records of as many deaths as he could. A summary of the data revealed that there were 133 deaths due to medical and psychiatric diseases. The combined medical and psychiatric disease death rate per annum per thousand was 0.44, based upon an average area strength during the period of 150,678. Eighteen percent of disease deaths and 0.78 percent of all deaths were due to malaria. Between 1 October 1942 and 1 August 1944, the best available figures indicate that 78,042 attacks of malaria occurred among Army personnel in the area. This means the attack death rate for malaria was 0.036 percent, ignoring the 2 months in which no deaths were reported. During the same period (1 October 1942-1 August 1944), there were 1,356 cases of pneumonia with 21 deaths, or a mortality rate of 1.5 percent.

MALARIA

Treatment of malaria occupied so much of the time of medical officers in the area that any account of medical activities would be incomplete without special consideration of that disease. This will be done briefly, as various aspects of the subject are dealt with in another volume in this series.²

The majority of doctors who went to the South Pacific early in the war had little practical knowledge of malaria. Those with specialized training were reserved for malaria control organizations, but the development of control on a large scale was slow (fig. 215). Medical officers were forced to learn by their own experiences. Many mistakes occurred because of the shortage of officers familiar with the difficulties found in treating malaria.

A few medical officers, particularly some from the southeastern section of the United States, came to the Pacific with a superficial background in the ordinary management of clinical malaria, but their influence was generally bad. Their experience with the use of quinine in the control of relapse in malaria due to a strain of *P. vivax* that relapses slowly had led them to attribute properties to the drug that it does not possess. Supplies of quinine were small in the Pacific, and its use was limited by order to patients who could not tolerate Atabrine. The chance scattering of these "malaria specialists" throughout many medical units is believed to have done much harm, for most of them retained their enthusiasm for quinine and blamed the failure to control relapses in malaria caused by *P. vivax* on the enforced use of Atabrine.

² Medical Department, United States Army, Internal Medicine in World War II. Volume II. Infectious Diseases. [In preparation.]



FIGURE 215. Malaria control. A. Classifying mosquito larvae at a Malaria Survey Unit, Bougainville, December 1943. B. Malaria Survey Unit making blood smears from natives, Bougainville, December 1943.

Nature of Malaria Observed

Epidemicity.—Doctors located on both highly malarious and nonmalarious islands had ample opportunity to deal with the disease. In the New Hebrides and the Solomons, which were intensely malarious, control by suppressive medication was poorly formulated and supervised. Consequently, in the early stages of the war, clinical attacks were numerous. When troops were evacuated from these areas to rear hospitals, whether evacuation was for malaria or not, suppressive medication was usually withdrawn, and after a short latent period initial attacks or reactivation developed.

Whole organizations were moved from malarious to nonmalarious islands in the hope they might regain the physical fitness lost in the unfavorable environment of combat areas. Part of the program of rehabilitation for these troops in 1943 was to withdraw suppressive medication in the hope that malaria would burn itself out. The discouraging result of this practice was the development of an alarming amount of chronic, rapidly recurring disease.

Species incidence.—Malaria in the South Pacific was almost entirely from infection with *P. falciparum* or *P. vivax*. Cases of quartan malaria were almost a curiosity. Infections from *P. falciparum* predominated during epidemics, with the number of infections from *P. vivax* increasing as control measures progressed or when troops were removed to nonmalarious areas and transmission ceased.

This reversal of species incidence is strikingly illustrated by the experience on Guadalcanal, where a large-scale epidemic of malaria occurred during the latter part of 1942 and the first half of 1943. Early in 1943, many troops who had acquired malaria on Guadalcanal were removed to nonmalarious areas, and suppressive medication was withdrawn. It was observed that the infections due to *P. falciparum* decreased steadily but were replaced by ones due to *P. vivax*.

The experience of the 147th Infantry is particularly pertinent (p. 612). The greater part of this regiment was on Guadalcanal from late 1942 to May 1943 before being moved to Western Samoa for demalarialization. In May 1943, cases of malaria on Guadalcanal were about equally due to *P. falciparum* and *P. vivax*. On Samoa, after several different therapeutic regimes based on use of Atabrine had been given to the entire regiment with extraordinary supervision, malaria caused by *P. falciparum* almost disappeared; roughly 4,000 cases of malaria developed within a period of just over 6 months, only 14 of which were due to *P. falciparum*.

Specific effect of Atabrine on the disease.—Medical officers concluded that Atabrine, even in suppressive doses, exerted a specific effect on infections from *P. falciparum* that prevented the development of clinical activity. This has been conclusively established elsewhere by carefully controlled experimental study. The amazingly low malaria mortality rate, the rarity of blackwater fever, and the comparatively low incidence of malignant malaria in the area has been attributed to the apparent specific effect of Atabrine.

Morbidity and mortality.—In May 1944, Colonel Baker sent a memorandum to all hospitals in the area requesting information on the number of cases of cerebral malaria, blackwater fever, rupture of the spleen, severe anemia associated with malaria, and deaths attributable to malaria. All hospitals replied, and the following information was compiled: Cerebral malaria, 46 cases; severe anemia, 14 cases; blackwater fever, 13 cases; and splenic rupture, 6 cases.

The casualty records in the Adjutant General's Section, Headquarters, USAFISPA, were examined for information concerning malaria as a cause of death. Between 3 October 1942 and 1 September 1944, 24 deaths were directly attributed to malaria. Of these, 16 (66 percent) were diagnosed as cerebral malaria. Undoubtedly, some of the remaining 8 recorded as malaria were actually instances of cerebral malaria. Blackwater fever was not recorded as the cause of a single fatality. This illustrated the importance of cerebral malaria as a cause of death.

Occasional cases of hemoglobinuria in Negro troops with malaria treated by Plasmochin naphthoate (pamaquine naphthoate) were observed. Ten of these cases were studied as carefully as laboratory facilities would permit, by Lt. Col. Henry E. Swartz, MC, and Capt. (later Lt. Col.) Milward W. Baylis, MC, of the 25th Evacuation Hospital and were reported in May 1944.

Diagnosis and treatment.—The diagnosis of malaria depends upon the identification of plasmodia in the peripheral blood. In spite of endless effort to teach this fundamental fact through circulars, letters, directives, and personal instruction, careless diagnostic habits persisted. Medical officers repeatedly claimed that the clinical features of malaria were so characteristic that it was neither just to the patient nor of scientific importance to withhold treatment until laboratory tests had confirmed a suspected diagnosis. Medical officers frequently defended diagnoses based on clinical findings alone with the erroneous contention that prolonged suppressive medication made it difficult to demonstrate parasites during clinical attacks.

The danger of withholding therapy in suspected cases of cerebral malaria was admitted, however. Officers were urged personally and by written directive to treat these patients promptly without waiting for laboratory confirmation.

Epidemics increase awareness of a disease and lead to erroneous diagnoses in a variety of conditions that develop coincidentally. In the South Pacific, some troops were so heavily seeded with malaria that it was a constant menace to diagnostic clarity in cases of infectious hepatitis, dengue, scrub typhus, pneumonia, meningitis, or intracranial hemorrhage.

An area directive on malaria emphasized the importance of the closest sort of diagnostic search and prompt, vigorous treatment for all suspected cases of cerebral malaria as well as other malignant forms of the disease. Diagnostic lumbar puncture was recommended for all patients suspected of having cerebral malaria, meningitis, or cerebral hemorrhage. The procedure undoubtedly prevented many serious errors.

Relapse as the chief problem.—An inherent characteristic of malaria due to *P. vivax* is its tendency to relapse. As time passed, the major malaria problem to internists was the control of such relapses, which vary considerably with different strains of *P. vivax*.

The malaria strains on Guadalcanal proved to have a frequent relapse rate. Early in 1943, hospitals to which patients were evacuated from Guadalcanal were having the same experience. Attacks of malaria were treated by the currently directed methods, and the patient would often have a relapse before he left the hospital.

Failure to use quinine in adequate amounts was the explanation most frequently given for a situation that fast became serious. Hospitals were overcrowded, physical and psychologic fitness of malaria patients deteriorated rapidly, and many evacuations to the United States resulted.

Quinine had been proven to be less effective in controlling malaria relapses than Atabrine, yet medical officers throughout the area were quietly conducting experiments with quinine and were spreading rumors that results were far superior to those obtained with Atabrine. Mapharsen (oxophenarsine hydrochloride), bismuth, and later even penicillin were all tried by enthusiastic therapists, with discouraging results.

Study of Relapse on Fiji

An extremely favorable condition for investigating the problem of relapse in patients with infections from *P. vivax* existed at Fiji, a nonmalarious island. The heavily seeded Americal Division, which had been removed from suppressive medication in the hope its malaria would burn itself out, was stationed there and provided abundant clinical material.³ The division was to remain at Fiji for approximately 9 months, providing a suitable analysis period (fig. 216).

Orders were issued directing the admission of all suspected malaria patients to the 142d and 18th General Hospitals, the 7th Evacuation Hospital, the 71st Station Hospital, or to the clearing company hospital of the 117th Medical Battalion. A card system for recording individual malaria attacks and a followup plan for all hospitals were evolved.

Letters and verbal instructions from higher echelons urged that the use of quinine as an antimalarial be abandoned except in highly selected cases in order to conserve diminishing stockpiles of the drug. Experience of Fiji had proved conclusively that Plasmochin naphthoate, in the doses employed, was of little, if any, value in controlling relapse in cases due to infection with *P. vivax*. Furthermore, its effects on the gastrointestinal tract were so troublesome that medical officers considered its use undesirable and large numbers of soldiers refused outright to take it.

³ Essential Technical Medical Data, Headquarters, USAFISPA, for April 1944.

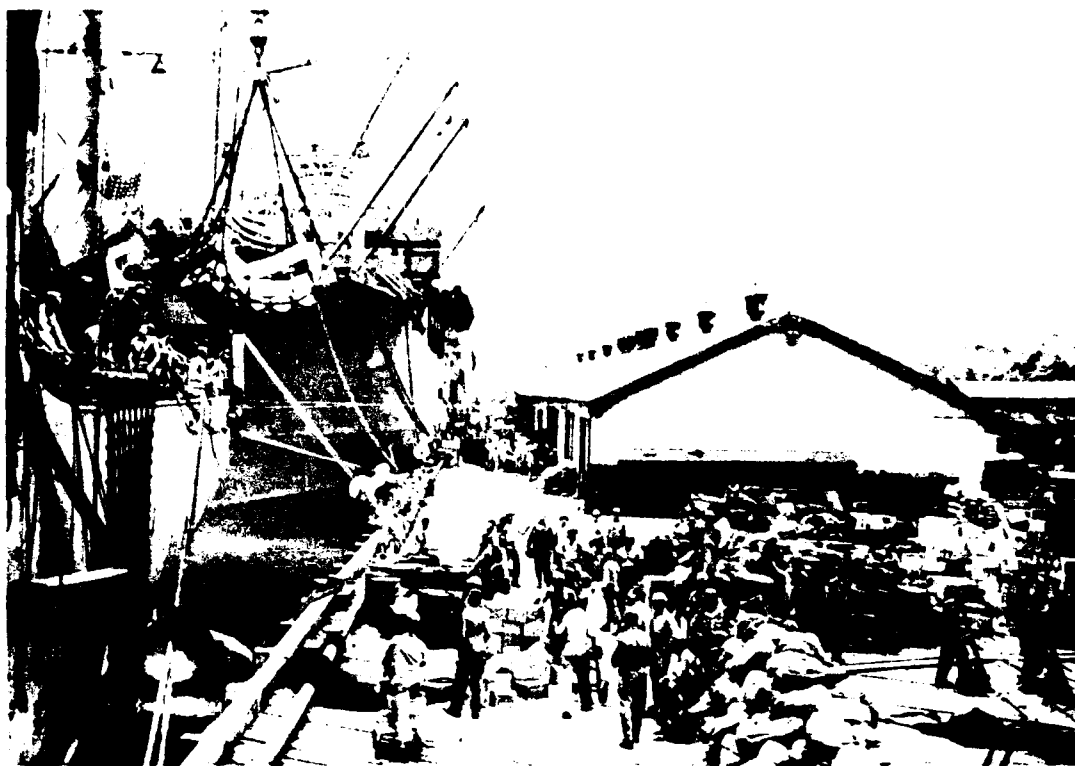


FIGURE 216. Troops of the Americal Division embarking from Fiji where the division had been sent for demalarialization.

Atabrine studies

Because of the known inadequacies of the other drugs in the treatment of malaria Atabrine was considered the drug of choice in the area. Objections were raised that it was toxic, that it could not control clinical malaria after long suppressive and frequent therapeutic use, and that it failed to alleviate fever and other symptoms of malaria as quickly as quinine.

Medical officers on the scene knew little of the fundamental pharmacologic facts about Atabrine, and the results of studies of the drug in the United States had not reached the South Pacific. The medical staff of the 18th General Hospital concluded that knowledge of the absorption and excretion of the drug and the relation of its concentration to clinical activity was needed. If these data could be supplied, they reasoned, Atabrine might possibly be used in a way that would improve the control of relapses in patients with infections from *P. vivax*.

Therapeutic value of drug. Capt. Roger A. Lewis, MC, was assigned the task of developing a method for making quantitative estimates of Atabrine in the blood. In spite of the critical lack of specialized equipment and shortage of reagents, Captain Lewis and Lt. Col. Alexander J. Schaffer, MC, developed a practical method for making such a quantitative analysis. Their system depended upon visual fluorometric comparisons of unknown serums with a stand

ard series of serums made up with Atabrine and extracted as the unknown serums were.⁴

The studies that followed were organized by Colonel Baker, who was then chief of the medical service of the 18th General Hospital. They were later taken over and expanded by Colonel Schaffer.

A variety of treatment routines was allotted to the several hospitals at Fiji. Atabrine was used in large and conventionally sized doses, for short and long periods, with large initial doses, and in various combinations with quinine and Plasmochin naphthoate. It was soon apparent that no combination of these drugs and no reasonably sized dose of Atabrine would control the high relapse rate. These conclusions were based on relapse rates in cases of malaria caused by *P. vivax* after various treatment regimes over two specific periods of time.

1. The relapse rates after treatment over an 84-day period were as follows:

<i>Treatment</i>	<i>Number of cases</i>	<i>Rate</i>
Atabrine—0.1 gm. t.i.d. for from 3 to 4 weeks.....	218	76
Atabrine—0.1 gm. t.i.d. for 7 days, Plasmochin—10 mg. b.d. for 5 days, repetition of both.....	191	68
Atabrine ("flash")—1.4 gm. in from 12 to 16 hrs.....	129	75
Quinine—From 1 to 3 weeks of quinine in the various usual doses.....	50	62
Atabrine and Quinine—Various combinations, usually 0.1 gm. Atabrine t.i.d. for 3 weeks and 0.3 gm. quinine t.i.d. for 1 week.....	99	70
Atabrine ("27")—0.3 gm. t.i.d. for 3 successive days.....	177	69

2. The relapse rates after treatment over a 70-day period were as follows:

<i>Treatment</i>	<i>Num- ber- of cases</i>	<i>Free inter- val</i>	<i>Rate</i>
Atabrine—1.0 gm. in 2 days.....	232	30	70
Atabrine—0.3 gm. in from 5 to 25 days plus 1.0 gm. in 2 days.....	52	30	86
Atabrine—1.4 gm. in 1 day plus 1.4 gm. 3d day.....	153	30	65
Atabrine—0.6 gm. in 7 days.....	192	37	72
Atabrine—1.0 gm. in 1 day plus 0.6 gm. in 6 days.....	122	45	81
Atabrine—0.4 gm. plus 0.6 gm. in 7 days.....	90	45	70
Atabrine—0.9 gm. in 3 days plus 0.6 gm. in 3 days.....	73	45	63

The following conclusions were drawn from the studies that have been briefly described here:

1. The serum concentrations of Atabrine of a large group of men taking the same dose vary over a wide range but are remarkably fixed for the individual. Thus, "high level" and "low level" men remain so.

2. Excessive urinary excretion of Atabrine does not account for low blood levels.

3. Most Atabrine disappears from the blood quickly when its administration is stopped, but detectable amounts remain for weeks.

⁴ Schaffer, A. J., and Lewis, R. A.: Atabrine Studies in the Field. I. The Relation of Serum Atabrine Level to Breakthrough of Previously Contracted Vivax Malaria. Bull. Johns Hopkins Hosp. 78: 265-281, May 1946.

4. Rapid reactivation of malaria following treatment is associated with exceptionally low blood-Atabrine concentration.

5. Large initial doses of Atabrine control the fever, parasitemia, and symptoms of malaria due to *P. vivax* as quickly and as well as quinine.

6. None of the treatment regimes employed reduce the relapse rate below 62 percent for a given period of observation.

7. The interval between relapses is much shorter when quinine is the anti-malarial employed than it is when Atabrine is used.

8. High initial doses of Atabrine, as compared with conventional doses, do not alter significantly the relapse rate. The same is true when high and low serum concentrations of the drug are used as the basis for comparison, except as just noted in conclusion 4.

Toxicity of drug.—Throughout the course of these studies, the dangers of Atabrine toxicity were carefully heeded. Observers were impressed by the unanticipated gastrointestinal tolerance of men for large doses of Atabrine. There were few exceptions to this occurrence. Jaundice, suppression of bone marrow activity, and dermatitis attributed to the use of Atabrine were not observed.

The only important manifestation of intolerance arose in the central nervous system. It was the subject of special study by Maj. (later Lt. Col.) Horatio W. Newell, MC, of the 142d General Hospital, and Capt. (later Lt. Col.) Theodore Lidz, MC, of the 18th General Hospital.⁵ Parts of the summary of their report indicate they reached the following conclusions:

Twenty-eight cases of toxic psychosis during or following the therapeutic administration of Atabrine are reported. Although the psychotic reactions occurred in less than 2 patients per 1,000 treated with Atabrine on this island, the number of mental reactions observed is believed the consequence of the heavy dosage frequently utilized in the treatment of malaria. Psychoses during treatment with 0.3 gm. daily for 7 days occurred rarely, for only two cases were seen, though large numbers of patients were treated in this manner. There appears to be a relationship between the frequency of psychotic reactions and the amount of Atabrine and the rapidity with which it is given.

Two cases are reported in which the psychosis not only cleared after withdrawal of the drug, but recurred when Atabrine was again given, and again cleared after cessation of therapy. Another case is cited of a subject who took the drug experimentally, never having had malaria, and became mildly psychotic. The three cases together indicate clearly that Atabrine causes psychotic reactions, and that malarial fever and the release of malarial toxins need not be etiologic factors as has sometimes been hypothesized.

In most instances the psychosis appeared during, or immediately following, the course of treatment. In a few patients, who received very large amounts of Atabrine over a short period of time, the onset was delayed and occurred a few days after the cessation of therapy.

Toxic psychoses are expected to clear after removal of the toxic agent. Eight of the 28 patients failed to recover adequately but only 2 were observed for more than a month after the onset of the psychosis. It is probable that two reactions represented schizophrenic psychoses which had been precipitated by the illness or the therapy, although the possibility of the production of permanent damage by large amounts of Atabrine cannot be excluded.

⁵ Newell, H. W., and Lidz, T.: The Toxicity of Atabrine to the Central Nervous System. *Am. J. Psychiat.* 102: 805-818, May 1946.

The clinical pictures observed varied widely, and resembled acute excitements of a manic or schizophrenic nature, severe depressive reactions, and paranoid schizophrenia. The presence of confusion, and particularly a sudden onset, with confused behavior and clouded sensorium, in a patient who had received Atabrine distinguished the reactions from nontoxic psychoses. Rapid recovery after cessation of therapy usually helped confirm the diagnosis.

The occurrence of psychotic reactions was found to be the major limitation to the amount of Atabrine which can be given safely. Because of these reactions and because of complaints of mild confusion and the occurrence of convulsive seizures in other patients, very heavy dosage was abandoned by one hospital, after which Atabrine psychoses again became a rarity.

Awareness of the possibility of Atabrine psychosis should lead the physician to appreciate the importance of early signs, such as feelings of confusion and of intoxication. Such awareness will permit more prompt withdrawal of the drug and, in some instances, might prevent a frank psychosis. Prompt diagnosis is essential to proper therapy, both in the immediate stoppage of Atabrine and in the handling of the psychotic reaction.

Seven cases are reported in which the patient suffered a generalized convulsion during or immediately following a course of Atabrine administered orally for the treatment of tertian malaria. One patient had experienced a single convulsion 8 years before, and in one case the seizure may have been caused by hypoglycemia. In the remaining five cases no basis for the convulsion could be found in the patient's history or by the examinations which were carried out, other than the coincidence with Atabrine therapy. It is known that Atabrine, particularly in large doses, can be toxic to the human central nervous system as it produces psychoses; and animal experimentation and the reports of the intramuscular use of Atabrine musonate have shown that toxicity can take the form of epileptiform seizures. It is therefore believed that the convulsions here reported were the result of Atabrine toxicity. The occurrence of convulsions during Atabrine therapy is extremely infrequent. Only one case is reported following conservative therapy, and despite the frequent usage of unusually large amounts of Atabrine on the island, the 7 cases represent an incidence of far less than 1 case per 2,000 malaria attacks treated with Atabrine.

Sulfonamide studies

The value of sulfamerazine in the treatment of malaria caused by *P. vivax* was investigated by Capt. Ephraim T. Lisansky, MC, of the 142d General Hospital and his collaborators.⁶ This study was most carefully controlled and executed and led to the following conclusions:

1. Sulfamerazine and sulfadiazine exerted a slow and mild action against naturally acquired *Plasmodium vivax in vivo*. Oral Atabrine dihydrochloride exerted a much more rapid and now definite action against this parasite.
2. Both sulfamerazine and sulfadiazine successfully aborted the clinical manifestations of relapsing *vivax* malaria in the majority of a small series of cases. Atabrine dihydrochloride successfully aborted the clinical symptoms of relapsing *vivax* malaria in all cases.
3. These sulfonamide drugs were not as effective as Atabrine in alleviating those symptoms which persisted after the paroxysms were aborted.
4. The sulfonamide drugs were only partially effective in clearing the peripheral blood stream of trophozoites and schizonts. In many of these cases gametocytes persisted. Atabrine dihydrochloride cleared the peripheral blood stream of parasites in all cases.
5. Positive smears and clinical symptoms recurred in almost all cases treated with either sulfonamide within 25 days after either of these drugs was discontinued. Those

⁶ Board for Coordination of Malarial Studies: Malaria Reports, vol. 1, No. 17, Washington, 1943-46.

cases treated with Atabrine had no clinical break-throughs or positive smears during the same period of time.

6. A comparison of the relative efficacy of the two sulfonamide drugs could not be made from this small series of cases.

7. Hematuria occurred in 1 of 14 cases receiving sulfamerazine. Toxic reactions [were] manifested by 2 of 10 cases receiving sulfadiazine. Hematuria occurred in one and the other developed leukopenia and a reduction in granulocytes. Those cases treated with Atabrine revealed no toxic reactions.

8. This report submits evidence that neither sulfamerazine nor sulfadiazine was a practical therapeutic agent against this strain of naturally acquired *virax* malaria. Atabrine dihydrochloride was a much more effective therapeutic agent than either of these sulfonamides against this strain of naturally acquired *virax* malaria.

Study of end results

The Americal Division lost large numbers of men through evacuation to the United States because of malaria. Others were transferred to service organizations and continued to exhibit frequent reactivations of malaria. These men afforded an excellent opportunity to study the total effect of chronic malaria.

Capt. Philip A. Tumulty, MC, Capt. (later Maj.) Edward Nichols, MC, Maj. (later Lt. Col.) Martin L. Singewald, MC, and Major Lidz, all of the 18th General Hospital, selected for complete physical and psychologic study 50 men who had suffered 10 or more attacks of malaria.⁷ This comprehensive investigation gave confidence to men in the area responsible for malaria policies by demonstrating that no measurable organic damage or dysfunction resulted from the weight loss and debility that were almost a constant sequel to chronic malaria. These symptoms seemed more related to the way individuals adjusted to chronic malaria and to concurrent situational factors than to the effects of the malaria alone.

Attempted Demalarialization on Samoa

The term "demalarialization" refers to attempts to rid heavily infected troops of malaria by removing them from malarious islands, withdrawing suppressive medication, administering to each man a course of antimalaria therapy, and allowing clinical attacks to develop. It was hoped that malaria would burn itself out.

This practice repeatedly produced unsatisfactory results. Malaria caused by *P. falciparum* subsided promptly, but, in that caused by *P. vivax*, relapses were frequent. Splenomegaly and parasitemia, without symptoms, became established in many men. Troops failed to gain weight or to regain vigor, evacuations were numerous, and the waste of hospital beds was enormous. The entire procedure proved to be highly ineffective.

147th Infantry

This regiment arrived at Guadalcanal in several echelons; the 1st Battalion on 4 November 1942, the 3d Battalion plus special units on 29 November

⁷ Tumulty, P. A., Nichols, E., Singewald, M. L., and Lidz, T.: An Investigation of the Effects of Recurrent Malaria; Organic and Psychological Analysis of 50 Soldiers. *Medicine* 25: 17-75, February 1946.

1942, and the 2d Battalion on 7 February 1943.⁸ These troops were given quinine sulfate as a malaria suppressive for a short time, but, on 29 November 1942, a weekly dose of 0.4 gm. of Atabrine became standard for suppression. On 12 May 1943, the entire regiment left Guadalcanal for the Territory of Western Samoa, a nonmalarious group of islands.

On Samoa, Atabrine was withdrawn from all troops at various rates. One group stopped Atabrine suddenly. A second took Atabrine 0.1 gm. 3 times daily for 7 days, rested 10 days, and then repeated the course before discontinuing all medication. A third group stopped Atabrine for 10 days and was then treated precisely as the second group was. The fourth group took Atabrine 0.1 gm. 3 times daily for 1 week, rested for 2 days, took Plasmochin naphthoate 0.1 gm. twice daily for 5 days, rested for 10 days, and then repeated the cycle. The fifth group continued Atabrine suppressive medication for 6 weeks and then stopped. All clinical attacks of malaria were treated by the standard quinine, Atabrine, Plasmochin naphthoate regime. Patients were then given no antimalarial drugs unless further attacks developed.

Approximately 90 percent of the men with long malarial exposure developed the disease, and approximately 85 percent relapsed at least once. The following conclusions can be drawn from the results of the various treatments given:

1. The suppressive regime followed on Guadalcanal cured few, if any, cases of malaria caused by *P. vivax*. Mass therapy with Atabrine or with a combination of Atabrine and Plasmochin naphthoate also was ineffective in curing latent infections due to *P. vivax*.

2. Mass therapy did not alter significantly the number of first relapses. When Plasmochin naphthoate was included in the mass therapy, it seemed to aid in lowering the peak malaria rates and to spread the experience over a longer period. It did not alter appreciably the final outcome insofar as initial attacks and first relapses were concerned. Plasmochin naphthoate may have aided in reducing slightly the number of total relapses, but this point was not clearly established.

Physical fitness at beginning and end of demalarialization attempt.—

Between 24 May 1943 and 27 November 1943, there were 2,313 first admissions and 2,597 readmissions on Samoa, making a total of 4,910 admissions from the regiment for malaria. The troops had been removed to Samoa for the purpose of rehabilitating them. Soon after their arrival there, Maj. Paul Harper, MC, conducted a physical survey of every fourth man on the company rosters.⁹ He obtained the following results:

⁸ (1) Essential Technical Medical Data, Headquarters, USAFISPA, for April 1944. (2) Levine, N. D., and Harper, P.: Malaria and Other Insect-Borne Diseases in the South Pacific Campaign, 1942-1945, IV. Parasitological Observations on Malaria in Natives and Troops, and on Filariasis in Natives. Am. J. Trop. Med. 27: 119-128 (suppl.) May 1947. (3) Downs, W. G.: Results in an Infantry Regiment of Several Plans of Treatment for Vivax Malaria. Am. J. Trop. Med. 26: 67-86, January 1946.

⁹ Report, Maj. Paul Harper, MC, to Commanding General, Samoan Group, 7 June 1943, subject: Medical Survey of Every 4th Man in 3 Battalions of the 147th Infantry After Leaving Guadalcanal.

	<i>Percent of soldiers</i>		<i>Average for two groups</i>
	<i>1st Bn.</i>	<i>3d Bn.</i>	
<i>Weight:</i>			
At or above Army standards	57.8	54.9	56.3
At or above minimum requirements	36.3	36.7	36.5
Below minimum requirements	5.2	8.2	7.0
<i>Color:</i>			
Good	17.3	13.4	15.4
Fair	65.7	75.1	71.4
Poor	16.8	11.3	14.1
<i>Nutrition:</i>			
Good	27.5	41.9	44.9
Fair	65.7	52.3	59.0
Poor	6.3	5.6	6.0
<i>Palpable spleen</i>	6.3	0.0	3.2

Shortly after it became necessary to resume suppressive medication in November 1943, a similar survey was conducted by Lt. Comdr. (later Capt.) Walter G. Reddick, MC, USNR, and 1st Lt. (later Maj.) Benjamin L. Huntington, MC, who reported the following to the Chief Surgeon, USAFI-SPA, on 1 December 1943:

	<i>Percent of soldiers</i>		<i>Average for two groups</i>
	<i>1st Bn.</i>	<i>3d Bn.</i>	
<i>Weight:</i>			
At or above Army standards	49.0	57.6	53.3
At or above minimum requirements	45.7	34.7	40.2
Below minimum requirements	5.0	7.7	6.4
<i>Color:</i>			
Good	37.8	43.0	40.4
Fair	52.5	45.8	49.2
Poor	9.6	11.1	10.4
<i>Nutrition:</i>			
Good	55.4	68.7	62.1
Fair	33.9	23.6	28.7
Poor	10.7	7.6	9.2
<i>Palpable spleen</i>	20.3	15.9	18.1
<i>Palpable liver</i>	24.8	20.0	22.4
<i>Positive smear</i>	19.2	23.5	21.4

It can be seen that the number of palpable spleens had increased considerably and that slightly over a fifth of the men had a febrile parasitemia. Otherwise, for practical purposes, the variations were not significant, except that the November survey was made after the troops had spent 6 months in a non-combat area with good food and regular hours for eating, sleeping, and working.

In order to render the regiment fit to return to a specific assignment, it was necessary to reinstitute Atabrine suppressive medication. This promptly reduced the high malaria rate. It is significant that a survey conducted a year after the resumption of suppressive medication revealed only 0.3 percent of

men with palpable spleens. The general physical fitness of the regiment had improved remarkably.

Americal Division

Attempts to demalarialize the Americal Division on Fiji met with much the same results. Physical and psychologic rehabilitation of these troops failed to occur, and it became necessary to reinstitute Atabrine suppressive medication in order to rehabilitate these troops and return the division to a combat assignment.

It was apparent that troops in the condition of those of the 147th Infantry and Americal Division were not fit to return to active duty after many months of attempted demalarialization. A large number of malaria patients were evacuated to the United States, but many remained who were having frequent relapses of malaria due to *P. vivax*.

Studies of Suppressive Therapy

The only course of action available was to attempt to control the remaining malaria by resuming suppressive medication. It was hoped, but not known, that this procedure would be effective. Many medical officers believed that Atabrine might lose some of its suppressive properties because the parasites acquired a tolerance to the drug. It was important to settle this question so that plans for reemploying heavily malarialized troops and treating those in in malarious areas could be formulated.

Americal Division.—An experiment was set up on Fiji to furnish the needed information. The subjects for this study were combat units of the Americal Division which were to engage in maneuvers under conditions simulating as closely as possible those of jungle combat.

One group was kept as a control and given no suppressive medication. Another was given Atabrine in quantities sufficient to establish blood levels equal to those that would be obtained by the current suppressive regime when equilibrium had been reached.

The results of the experiment were clear. Malaria in the control group remained roughly at the level it had been during previous months. Malaria in the experimental group was almost completely eliminated. The cases of clinical malaria that did develop were usually in men who had low Atabrine blood levels.

This information led to a policy change concerning the use of heavily malarialized troops. Thereafter, troops were kept on continued suppression whether they remained in malarious areas or were removed to nonmalarious ones for rest and recreation.

25th Infantry Division.—This was the first organization to continue suppressive medication after removal from a malarious area. This division arrived on Guadalcanal, 25 December 1942, and became heavily seeded with malaria (fig. 217). Atabrine suppressive medication, although directed, was not



FIGURE 217. 25th Infantry Division on Guadalcanal. Supplies and the sick and wounded transported by boat, January 1943.

rigidly administered. In April 1943, a peak malaria rate of 2,385 per annum per 1,000 average strength was reached on Guadalcanal.

In December 1943, the division went to New Zealand, and Atabrine suppressive medication was continued. Throughout the rest period, it was suspected that Atabrine discipline was not satisfactory, although, as reported in the area April 1944 ETMD, repeated checks were said to disclose that every precaution was being exercised to insure faithful ingestion of the drug.

In early March, sample groups of men were questioned confidentially regarding their adherence to orders, and Atabrine blood levels were checked in these men. Suspicions of poor discipline were entirely confirmed. It was found that many men were careless in their suppressive medication habits. When this information was taken to the commanding general, a renewed effort at perfect Atabrine discipline was promised, and fine results were obtained.

147th Infantry Regiment. Many responsible medical officers were concerned, however, over the decision to continue suppressive medication with Atabrine. Military necessity forced control of malaria by the use of continued suppression, but it was widely believed that the evil day was only being postponed. It was feared that when suppression was finally withdrawn there

would be the same outburst of malaria that had been repeatedly observed after shorter periods of suppression were terminated.

A group of heavily exposed men of the 147th Infantry gave promise of providing an answer to this important question. The group was followed through various malaria experiences from its arrival on Guadalcanal in November 1942 to Iwo Jima in August 1945. The period of observation included heavy malaria exposure, light exposure, initial atabrinization, deatabrinization, long-continued suppressive medication, and finally terminal deatabrinization.¹⁰

It was concluded from a study of this group that long-continued Atabrine use is highly effective in controlling clinical activity of heavy *P. vivax* malaria seeding over a prolonged period, provided proper attention is given to the all important matter of Atabrine discipline. Furthermore, it seemed justifiable to conclude that Atabrine in suppressive doses over long periods destroys a large amount of malaria due to *P. vivax* that would have become clinically active had suppressive control been withdrawn sooner.

In November 1943, a letter from The Surgeon General to the Commanding General, USAFISPA, requested a study of the value of totaquine in the treatment of clinical malaria. The medical consultant organized this study under the direction of Capt. (later Maj.) Robert A. Green, MC, and Maj. (later Lt. Col.) Evrela A. Larson, MC, at the 31st Station Hospital.

Comparative study of quinine, totaquine, and Atabrine.—The antimalarial effects of quinine, totaquine, and Atabrine were compared in a series of patients with clinical malaria from a heavily seeded artillery battalion, and the study was reported in the area ETMD for April 1944. Cases were treated in rotation with the three drugs. With a negligible number of exceptions, the malaria was all caused by *P. vivax*. The results of this study may be summarized as follows:

1. Totaquine caused disappearance of malaria parasites from the blood stream in a time slightly greater than was the case when quinine and Atabrine were employed.

2. Totaquine controlled fever and symptoms as well as quinine or Atabrine.

3. Incidental effects consisting of nausea and vomiting were somewhat greater with totaquine than with either quinine or Atabrine.

4. The intervals between attacks and subsequent relapses were shortest in cases which had been treated with totaquine (13.7 days), longer (15.2 days) in cases treated with quinine, and longest (37.4 days) in cases treated with Atabrine.

5. Of 80 cases treated with totaquine, 65 percent relapsed at least once during the 8 weeks of observation; of those treated with quinine, 70 percent relapsed; and of those treated with Atabrine, 38.7 percent relapsed.

¹⁰ Baker, B. M., and (by invitation) Platt, D.: The Effect of Long-Continued Suppressive Atabrine Medication Upon Relapses of Vivax Malaria. Trans. Am. Clin. & Climatol. Assoc. 58: 145-152, 1946. See also Bull. Johns Hopkins Hosp. 81: 295-304, November 1947.

Studies on Immunity

Medical officers wondered whether the prompt and effective treatment of clinical attacks might not prevent, or at least limit, the development of biologic resistance.

In the summer of 1943, Maj. (later Lt. Col.) George G. Carter, MC, of the 39th General Hospital investigated this matter. He permitted the attacks of malaria caused by *P. vivax* to pursue a part of their clinical course in a small group of patients by withholding antimalarial drugs. However, satisfactory results were never obtained because the group was a transient one and Major Carter had no means of making certain his subjects did not take Atabrine of their own volition in order to enjoy the pleasant attractions of New Zealand.

Early in 1944, General Morgan, The Surgeon General's chief consultant in medicine, requested Colonel Baker to organize a new study of the problem. The fundamental prerequisite was to obtain an experimental group that could be kept under observation for a sufficient period to provide reliable data. Through the cooperation of the Chief Surgeon and the Commanding General, USAFISPA, and the Commanding General, 43d Infantry Division, a group of volunteers was made available for 1 year.

Major Carter was selected to head the investigation, which began in March 1944. Seventy-two men were allowed to have from 10 to 12 paroxysms of malaria due to infection from *P. vivax*. Their relapse experience was compared with that of a control group whose malaria was promptly terminated by Atabrine therapy. It was shown that a certain amount of immunity, as gaged by subsequent relapse experience, could be induced, but the immunity was not sufficient to justify the use of the procedure in the practical management of relapses in patients with malaria.¹¹

OTHER DISEASES

Arthritis

In early 1944, Capt. Frank McCarry, MC, Capt. (later Maj.) Owen B. Royce, MC, and Lt. Col. Bert E. Mulvey, MC, all of the 21st Evacuation Hospital (fig. 218), observed and reported on a peculiar condition on Bougainville which was not recognized on any other island in the area.¹² The disease occurred in widely scattered organizations of the Bougainville force. During March, April, and May of 1944, there were 124 cases admitted to the 21st Evacuation Hospital. It is known that many more with milder clinical manifestations were treated and returned to duty by unit medical officers.

Forty-one cases were selected for particular study, although the clinical findings were generally similar in all of them. All but six of the patients were mildly febrile for an average of 2 days. The average fever was 100° F., with the highest reaching 101° F. All had polyarthritis consisting of pain,

¹¹ Essential Technical Medical Data, Headquarters, USAFISPA, 15 May 1945, Inclosure No. 16.

¹² Essential Technical Medical Data, Headquarters, South Pacific Base Command, for August 1944.



FIGURE 218. Underground ward, 21st Evacuation Hospital, Bougainville, April 1944.

limitation of motion, and joint effusion. Redness and increased skin temperature were rare. The knees were most frequently involved, with the duration of joint disability averaging 14.6 days between extremes of 3 and 43 days.

Faint maculopapular rashes occurred in 13 cases; 7 had moderate general enlargement of the lymph nodes, and 7 others had regional enlargement. Splenomegaly was not observed. Leukocyte counts ranged from 3,900 to 12,500 per cm., and the average sedimentation rate was 12 mm. per hour. Joint fluids had the characteristics of exudates, but repeated cultures were sterile. The results of other laboratory examinations including urinalyses, blood counts, serum agglutination tests, and microscopic and bacteriologic examination of feces were not noteworthy.

A certain similarity between this condition and one observed by Lt. Col. Frederick C. Weber, Jr., MC, Lt. Col. Theodore W. Oppel, MC, and Capt. (later Maj.) Robert W. Raymond, MC, in the Schouten Islands of the Southwest Pacific (off the northern coast of New Guinea) was discovered later.¹²

Diphtheria

During the early days of the war, it was not generally known that diphtheria occurred in the tropics. However, when casualties from Guadalcanal began to arrive in rear area hospitals, it was not uncommon to find cases of neuritis of undetermined etiology.

¹² Weber, F. C., Oppel, T. W., and Raymond, R. W.: A Milder, Infectious Disease Seen in the Schouten Islands, *Am. J. Trop. Med.*, 26: 489-495, July 1946.

Just how many cases there were is not known, but Colonel Baker's experience later led him to conclude that the number was considerable. Among these were a few instances of serious bulbar paralysis, suggesting diphtheria. Suspicions were confirmed when a small epidemic of pharyngeal diphtheria developed in the Americal Division after it moved from Guadalcanal to Fiji.

Cutaneous diphtheria was first recognized by Capt. (later Lt. Col.) Averill A. Liebow, MC, early in 1943 on New Zealand. A series of investigations by Colonel Liebow, Lt. Col. John H. Bumstead, MC, Maj. Louis G. Welt, MC, and Capt. (later Maj.) Paul D. MacLean, MC, of the 39th General Hospital, continued until the end of the war.¹⁴

Medical officers were slow to accept the rather frequent occurrence of cutaneous diphtheria among troops who had been exposed to extreme tropical conditions as more than a mere medical curiosity. This was largely owing to a shortage of adequate laboratory facilities and properly trained laboratory personnel. Even after the existence of the disease was widely publicized by Colonel Baker through personal interviews and two circular letters, medical officers remained skeptical and often failed to obtain laboratory confirmation of diagnostic suspicions.

Colonel Liebow and other diphtheria experts traveled throughout the South Pacific giving demonstrations and teaching elemental diagnostic facts. The disease gradually became accepted as an important one, isolation was enforced, and case totals fell.

Intestinal Parasitism

Troops throughout the South Pacific, with the exception of those in New Zealand, came into close contact with native populations heavily infested with intestinal parasites. Examinations of stools eventually became almost routine for hospitalized patients. The incidence of ancylostomiasis was discovered to be surprisingly high, whereas the incidence of amebiasis was surprisingly low.

Sporadic cases of infections from *Endamoeba histolytica* were continually observed throughout the area, but only one significant epidemic of the disease occurred. This was in 1944 among troops of the 37th Infantry Division on Bougainville (fig. 219). Preliminary reports indicated a high rate of infection. But Bougainville passed to the control of the Southwest Pacific Area in June 1944 before the study of this epidemic was complete.

Stool examinations made at the 39th General Hospital during two comparable periods of 1944 and 1945 illustrate the parasitism encountered in troops who had been evacuated from the Solomon Islands or sent to New Zealand after combat.¹⁵

A summary of stool specimens examined between 27 April and 27 July 1944 is shown in the following tabulation:

¹⁴ Liebow, A. A., MacLean, P. D., Bumstead, J. H., and Welt, L. G.: Tropical Ulcers and Cutaneous Diphtheria. *Arch. Int. Med.* 78: 255-295, September 1946.

¹⁵ Liebow, A. A., Milliken, N. T., and Hannum, C. A.: Isopora Infections in Man. *Am. J. Trop. Med.* 28: 261-273, March 1948.



FIGURE 219. 37th Infantry Division, Bougainville. A. Litter squad fording a stream on way to hospital and station, December 1943. B. Tank in infantry team in action, March 1944.

<i>Patients for whom examination was made</i>	<i>Number</i>
Parasitized patients.....	¹ 155
Nonparasitized patients.....	389
Total.....	544
<i>Stool specimens examined</i>	
Parasitized stools (positive).....	² 463
Nonparasitized stools (negative).....	881
Total.....	1,344

¹ Of the 155 parasitized patients, 112 harbored significant parasites.

² Of the 463 parasitized stools, 405 were significant.

A breakdown of the species of parasites found in the 463 parasitized stools appeared as follows:

<i>Parasites</i>	<i>Number of patients¹</i>	<i>Number of positive stools</i>	<i>Percent of patients²</i>
Hookworm (species undetermined).....	107	395	20.0
<i>Endamoeba coli</i>	44	46	8.0
<i>Endolimax nana</i>	9	11	2.0
<i>Strongyloides stercoralis</i>	7	8	1.0
<i>Enterobius (Oxyuris) vermicularis</i>	2	2	.4
<i>Giardia lamblia</i>	1	1	.2

¹ Some of the 155 parasitized patients harbored more than one species of parasite.

² Percentages based on the 544 parasitized and nonparasitized patients.

A summary of stool specimens examined between 27 April and 27 July 1945 is shown in the following tabulation:

<i>Patients for whom examination was made</i>	<i>Number</i>
Parasitized patients.....	¹ 205
Nonparasitized patients.....	182
Total.....	387
<i>Stool specimens examined</i>	
Parasitized stools (positive).....	² 416
Nonparasitized stools (negative).....	613
Total.....	1,029

¹ Of the 205 parasitized patients, 129 harbored significant parasites.

² Of the 416 parasitized stools, 278 were significant.

A breakdown of the species of parasites found in the 416 parasitized stools appeared as follows:

Parasites	Num- ber of pa- tients ¹	Num- ber of posi- tive stools	Per- cent of pa- tients ²
Hookworm (species undetermined).....	98	172	25.0
<i>Endolimax nana</i>	50	66	13.0
<i>Endamoeba coli</i>	36	52	9.0
<i>Endamoeba histolytica</i>	25	29	7.0
<i>Trichuris trichiura</i>	21	38	5.0
<i>Ascaris lumbricoides</i>	15	37	4.0
<i>Isospora hominis</i>	3	17	.75
<i>Strongyloides stercoralis</i>	3	4	.75
<i>Chilomastix mesnili</i>	1	1	.25

¹ Some of the 205 parasitized patients harbored more than one species of parasite.

² Percentages based on the 387 parasitized and nonparasitized patients.

Colonel Liebow made an exhaustive study of the relation of eosinophilia to ancylostomiasis and strongyloidosis in the area.¹⁶ The following conclusions are quoted from one of his reports:

1. In certain areas of the South Pacific eosinophilia has been closely correlated with recently acquired hookworm or *Strongyloides* infection; consequently its detection has served as a convenient and rapid tool for the investigation of the natural history and epidemiology of these conditions.

2. Even light infections may be associated with a marked eosinophilia during the first 4 months. Consequently, before drawing conclusions concerning the significance of the eosinophilia many stool examinations may be necessary to demonstrate the ova or larvae, even if sufficient time has elapsed for oviposition to have taken place in the intestine.

3. Study of large numbers of hospital patients continuously evacuated from the islands has shown that peaks of eosinophilia and leukocytosis occur between 3 and 4 months after infection, but the eosinophilia is probably still useful as a criterion of hookworm or *Strongyloides* infection as much as one year later.

4. Hookworm infection as indicated by eosinophilia has been widespread among combat troops in the islands of the South Pacific, although severe hookworm disease is rare.

5. The infection affects chiefly front-line infantry soldiers, is in the main acquired during combat, is proportional in extent to the duration of the fighting, and is increased by the use of native or captured enemy bivouac areas.

6. *Ancylostoma duodenale* has been the common species in troops infected in the South Pacific.

7. Biological cure, using tetrachlorethylene, has been difficult to attain, even in lightly infected individuals.

8. Continued re-exposure of the large number of men already involved, as by further campaigning in heavily seeded areas, or a decline in the quality or amount of the diet, may convert subclinical infection into disease of military importance.

Diarrheal diseases, infectious hepatitis, filariasis, dengue, and scrub typhus were all encountered in the South Pacific, some of them in large epidemics. They presented important problems to preventive medicine personnel and to internists who were responsible for the diagnosis, treatment, and disposition of cases. No particular contributions were made by internists to the management of these conditions.

¹⁶ Liebow, A. A., and Hannum, C. A.: Eosinophilia, Ancylostomiasis, and Strongyloidosis in the South Pacific Area. *Yale J. Biol. & Med.* 18: 381-403, May 1946.

CHAPTER VII

Central Pacific Area

Verne R. Mason, M.D.

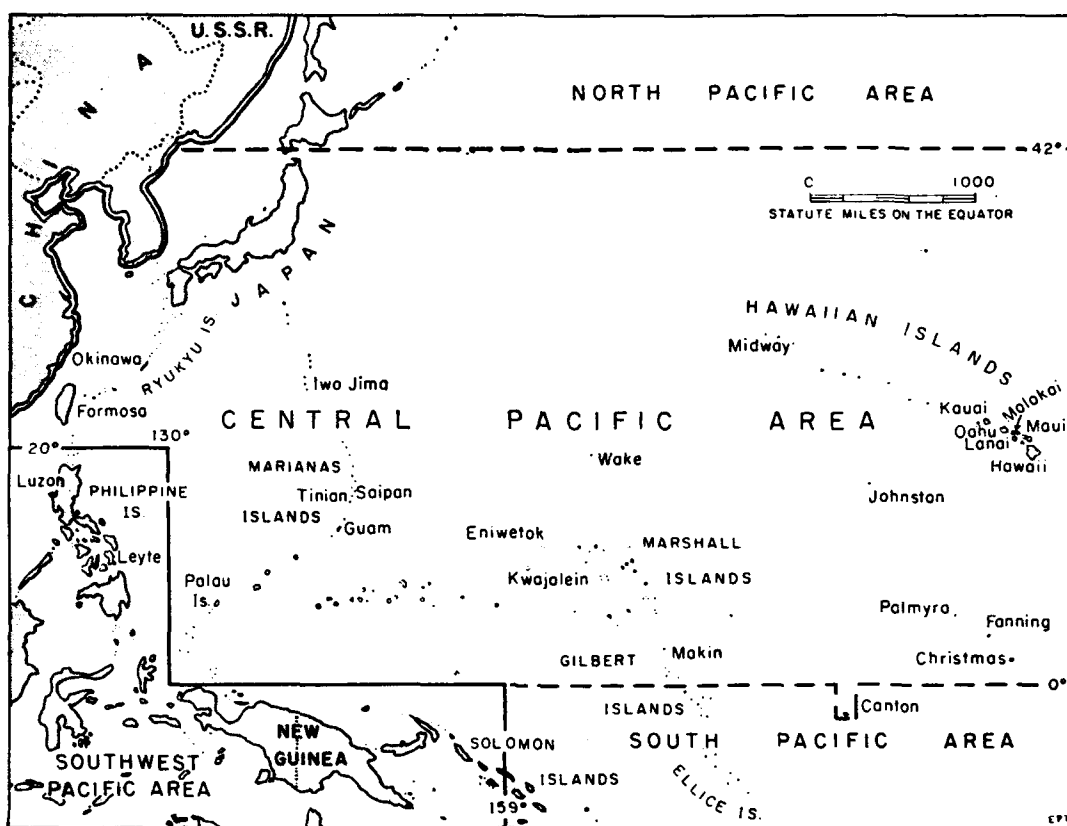
The campaigns in the Pacific Ocean Areas¹ during World War II were of peculiar medical significance for a number of reasons. The attacks were made by amphibious landings of relatively small task forces to capture the coral islands and were, in general, combined actions of the Army, the Army Air Force, the Navy, the Naval Air Force, and the Marines. These assaults on the beaches of the Pacific islands called for highly coordinated activities of the medical services of the various components of the Armed Forces. In general, the islands were parts of coral atolls, and the climate was hot and humid. Potable fresh water was practically never available. Sanitary conditions were primitive in all areas occupied by the Japanese forces, and after the campaign had lasted a few days these areas became dangerous for the assault troops owing to the increase of arthropods wherever unburied dead were numerous. On one or another of these islands, practically every exotic disease of military importance was encountered.

The campaign in the Ryukyu Islands was the first in the Pacific in which adequate amounts of whole type O blood were available. It is probable that during this action wounded troops received more blood by transfusion per battle casualty than in any previous campaign. During the early part of the assault, the field hospitals and smaller installations were the only medical facilities available. Moreover, patients in shock must be treated at the earliest possible moment after injury. For these reasons, some comments have been made here on the organization and equipment of the field hospital.

The exotic diseases encountered in the CPA (Central Pacific Area), map 5, have been described chiefly as they occurred in relation to military campaigns. No attempt has been made to write a detailed description of diseases of military importance in this area. Such information is readily available elsewhere. What has been attempted is a discussion of the occurrence of such diseases under the battle conditions of World War II and methods evolved to control them.

A study of Japanese B encephalitis on the island of Okinawa is described in some detail because of its inherent interest. So, also, are the epidemics of dengue fever that occurred on Saipan and the method of mosquito control that

¹The command Pacific Ocean Areas during most of World War II consisted of the following three subordinate command areas: South Pacific Area, Central Pacific Area, and North Pacific Area. This chapter pertains to medical consultant activities in the Central Pacific Area. U.S. Army Forces in this area were under the command known as the Hawaiian Department from 1939 until August 1943, when the command U.S. Army Forces in the Central Pacific Area, was established. This command became U.S. Army Forces Pacific Ocean Area in July 1944, and in July 1945 it was redesignated U.S. Army Forces Middle Pacific. The term "Central Pacific Area" will be used throughout the chapter unless specific reference to one of the foregoing Army commands is indicated.



MAP 5.—Central Pacific Area.

was devised to stamp out the disease. Some account is given of the cases of infectious hepatitis seen after nearly every assault on the Pacific islands; of dysentery, particularly in patients from the Marianas, the Philippines, and Okinawa; of filariasis, particularly in the Gilbert Islands; of diphtheria; of venereal diseases; and of other problems in internal medicine. There is some discussion of the consultant system and its relation to the medical services of the Army in wartime.

This brief history of internal medicine in the Central Pacific in World War II has been compiled from documents in The Historical Unit, U.S. Army Medical Service, from large numbers of reports by medical consultants and other medical officers; from relevant War Department general orders; from ETMD (Essential Technical Medical Data) reports; and from theater memorandums. In addition, some material has been obtained from the files of the author and from the reports of medical consultants with other organizations in the Central Pacific. From these sources, objective original data have been incorporated. Since much official military correspondence does not identify the actual writer, attribution could not be given individuals in many instances.

EXPANSION AND ORGANIZATION OF THE MEDICAL SERVICE

The war in the Pacific began in the Hawaiian Islands, on the island of Oahu, on the morning of 7 December 1941. The Japanese bombing of Pearl Harbor was unexpected, although frequently predicted, and came as a complete surprise to both Army and Navy forces on Oahu. Since the casualties were extremely high, the Army medical service on Oahu began to function immediately. Some events of that fateful day and of a few subsequent days were recorded in diary form on the blotter of the secretary to the Surgeon, Hawaiian Department. These notes, with the addition of information written down during telephone conversations, are reproduced here for their historical interest.

7 December 1941:

- 0915 hours.—A medical officer left Fort Shafter for Honolulu, T.H., to get 10 civilian physicians and 6 operating surgeons. These 16 physicians were sent to Tripler General Hospital, in Honolulu.
- 0940 hours.—Bellows Field reported 6 wounded in action and 1 killed in action.
- 0950 hours.—Wheeler Field reported 57 casualties. There were 5 killed in action and 20 seriously wounded.
- 0955 hours.—Sixty casualties were sent to Tripler General Hospital. Of these, 3 or 4 were dead on arrival. Many casualties were being reported, and some of these were civilians.
- 1020 hours.—Reports of 300 wounded and at least 50 deaths were received. The civilian physicians of Honolulu offered the services of the blood bank and, in addition, gave what plasma was on hand to the Army. The supply of ambulances from various Army sources was adequate.
- 1135 hours.—A request was made to have Kamehameha School, Honolulu, prepared for a hospital.
- 1140 hours.—Hickam Field (fig. 220) reported from 300 to 400 wounded and from 50 to 75 killed. About 25 hospital beds at Waimanala were taken over by the Army.
- 1305 hours.—There were 75 casualties at Station Hospital, Schofield Barracks, T.H., and 470 at Tripler General Hospital. There were 22 dead at Schofield Barracks and 46 dead at Tripler General Hospital.
- 1445 hours.—There was considerable difficulty getting enough ambulances.

8 December 1941:

- 0001 hours.—Arrangements were made to open up Saint Louis College, Honolulu, as a hospital. It was directed that 1000 hospital beds be installed.
- 0522 hours.—Two surgical teams were formed and sent to the Kamehameha School.

0810 hours.—From Schofield Barracks, reports showed 36 dead, 25 seriously injured, and 75 lightly wounded. From Wheeler Field, 35 dead, 56 seriously wounded, and 50 with minor wounds were reported.

9 December 1941:

1105 hours.—Tripler General Hospital reported 152 dead, 55 seriously wounded, and 125 slightly wounded.

1850 hours.—All useful apparatus from the Japanese hospital was sent to Saint Louis College.

Following the Japanese air raid on Pearl Harbor and on the airfields on Oahu, there were 713 battle casualties of whom 225 died. Following are data on the disposition of casualties from 0800 hours on 7 December 1941 to 2400 hours on 10 December 1941:

	<i>Tripler General Hospital</i>	<i>Schofield Barracks</i>	<i>Hickam Field</i>	<i>Total</i>
Number of patients in hospital prior to 0800, 7 December 1941.....	456	531	29	1,016
Admission:				
Battle casualties (seriously and slightly wounded).....	340	121	27	1,488
Other than battle casualties.....	10	62	3	75
Number of dead upon arrival at hospital.....	132	27	0	159
Number who died upon admission.....	11	11	0	22
Disposition:				
Battle casualties to duty.....	9	51	13	73
All others.....	243	336	23	602
Total number of beds vacant.....	642	² 819	37	1,498
Total known dead since 7 December 1941.....	143	38	0	³ 225
Total seriously wounded since 7 December 1941.....	75	38	1	114
Total slightly wounded since 7 December 1941.....	265	83	26	374
Total battle casualties since 7 December 1941.....				713

¹ Surviving.

² On 10 December, 237 additional beds were set up at Schofield Barracks.

³ Includes 44 dead taken directly to the morgue.

Organizational data.—The Surgeon's Office, Hawaiian Department, was comparatively small at the beginning of the war. The Surgeon and 9 other officers, together with 8 enlisted men, made up the staff.

On 7 December 1941, the staff was divided into a forward and rear echelon. On that date, the rear echelon, consisting of the bulk of the administrative section, moved into offices at Farrington High School, Honolulu. A file clerk and guard remained with the records at Fort Shafter, T.H. The forward echelon moved into Aliamanu Crater with the commanding general and other members of his staff.

The Surgeon, Hawaiian Department, on 7 December 1941 was Col. (later Brig. Gen.) Edgar King, MC. During the last part of 1941 and the early part of 1942, Col. Clarence E. Fronk, MC, acted as professional consultant.

All professional activities were consolidated in the office of the professional consultant. Medicine, surgery, orthopedic surgery, neuropsychiatry, and

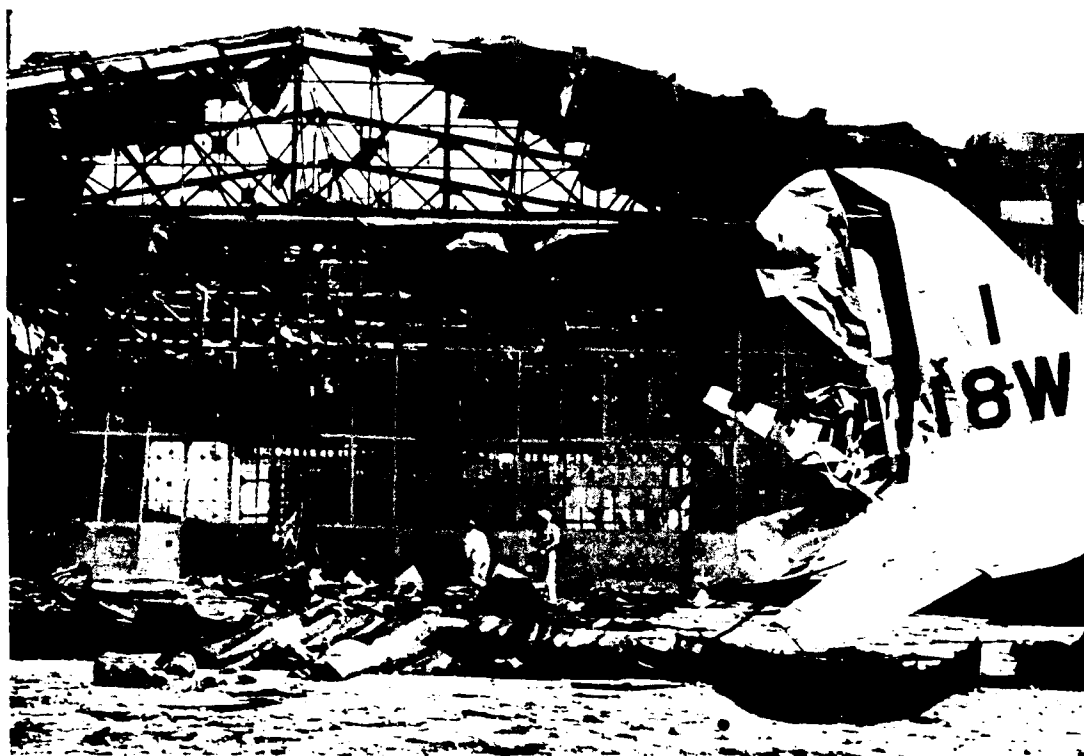


FIGURE 220.— Destruction at Hickam Field, Hawaii, 7 December 1941.

other specialties were all under the supervision of Colonel Fronk. As more professional personnel were made available by the War Department, special consultants obtained from Army hospitals on the island and from the United States were added to the Surgeon's staff. Their duties consisted of supervision, training, and advisory work in connection with clinical practice in their specialties.

As of December 1942, officer personnel in the Surgeon's Office consisted of General King, Surgeon, and a number of Medical, Sanitary, Veterinary, Dental, Medical Administrative and Army Nurse Corps officers. At this time, Lt. Col. (later Col.) Charles T. Young, MC (fig. 221A), was acting Consultant in Medicine; Lt. Col. (later Col.) August W. Spittler, MC, was acting Consultant in Surgery, and Capt. (later Lt. Col.) Robert C. Robertson, MC, was Consultant in Orthopedic Surgery.

Requisitions for necessary personnel were submitted to the War Department at monthly intervals and, in emergencies, by radiogram. The shortage of military personnel was, in fact, very acute in the early months of the war and necessitated the employment of local civilian personnel.

A unique assignment in the Surgeon's staff was that of civilian-liaison officer. As envisaged in the organization planned by General King, civilian doctors were vital to adequate care of military casualties in case of disaster. Also under mobilization plans, the U.S. Army Medical Department was responsible for civilian casualties including gas casualties. Plans were accordingly

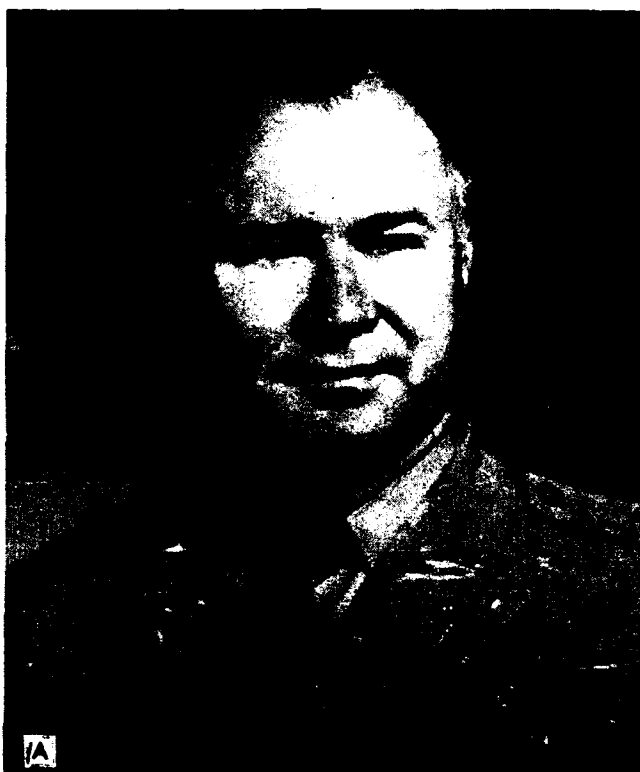


FIGURE 221.—Consultants in medicine, Central Pacific. A. Col. Charles T. Young, MC, Consultant in Medicine, Office of the Surgeon, USAFCPA.

made to control all hospitalization, both civilian and military, to establish first aid stations throughout Oahu, and to provide for supplementary professional care of military personnel by civilian doctors residing in the Territory. To accomplish all this required constant liaison with civilian agencies, and the officer placed in charge was responsible for proper planning, for training, and for execution of all policies formulated by the Surgeon and leaders of the Honolulu Medical Society.

In March 1942, service commands were established to administer the military affairs of the other islands of the Hawaiian group. A surgeon was appointed to each of the following service commands: Hawaii, Maui, Molokai-Lanai, and Kauai.

Medical supplies stored at Fort Shafter were generally adequate and of excellent quality. When a shortage occurred, reserve stocks were ample to fill it. Wartime requisitioning procedures on the mainland (continental United States) had been established before 7 December 1941. During 1942, branch depots were established on the islands of Maui, Kauai, and Hawaii to supply the service commands of those districts. At the branch depot at Schofield Barracks, the construction of five additional warehouses brought the total to nine. A warehouse was also completed at Fort Ruger. Stocks were further dispersed in the various hospitals of the Hawaiian Department for security in case of attack.



FIGURE 221.—Continued. B. Col. Verne R. Mason, MC, Consultant in Medicine, Office of the Surgeon, Ninth Service Command; Consultant in Medicine, Office of the Surgeon, USAFMIDPAC (formerly USAFPOA).

The Surgeon was appointed anti-biological-warfare officer in addition to his other duties. This appointment made it possible to consolidate many activities in that field already receiving General King's attention.

On 7 December 1941, the Surgeon had been made adviser to the Commanding General, Hawaiian Department, in all matters concerning potential danger from contamination of food or sources of drinking water. Military personnel and civilians over 6 months of age were immunized with smallpox, typhoid, paratyphoid A, and paratyphoid B vaccines. All chemical poisons were impounded and their sale and distribution kept under strict control. The principal water-supply systems of each island were investigated in detail. Fencing and the number of guards were immediately increased. The department laboratory daily performed tests for common poisons on water collected from the main sources of supply. Purchase of fresh milk for Army messes was prohibited.

The general impression derived from an examination of the records during this period is that many functions were centralized in the hands of the Surgeon, owing both to the lack of personnel and to a tendency to concentrate duties in a single office.

Operation of the medical plans, under the general mobilization plans, functioned with great smoothness and efficiency, and this did much to alleviate the effects of the Japanese attack.

Expansion of the Hawaiian Department and the Central Pacific Area

The Farrington High School in Honolulu, a group of new concrete buildings in the Kalihi district, was taken over to provide expansion wards for Tripler General Hospital on 7 December 1941. On that date, approximately 200 convalescents were transferred from that hospital's permanent buildings, and messing facilities were established in the school cafeteria. Maj. (later Col.) Donald C. Snyder, MC, was placed in charge of Farrington wards. The bed capacity was approximately 300.

A part of the Kamehameha School was taken over as Provisional Hospital No. 1 on 7 December 1941. Later (4 August 1942), the hospital became an integral part of Tripler General Hospital. Two operating rooms for reserve use were established on 7 December 1941 in the school infirmary but were not put into active service. The concrete dormitory building of this school had 240 single rooms making a hospital capacity of 240 beds. However, the precipitous nature of the terrain and the arrangement of the drives, paths, and stairways made it difficult to adapt this hospital to surgical use despite the advantages offered by its excellent infirmary, which was readily adaptable for extensive surgery (fig. 222).

Saint Louis College, in the Kaimuki district of Honolulu, was taken over as Provisional Hospital No. 2 on 8 December 1941. This was established later as the 147th General Hospital.

On 14 August 1943, the Hawaiian Department was expanded and changed to USAFICPA (U.S. Army Forces in the Central Pacific Area). During the following 12 months, the Medical Department provided support for the offensive actions conducted by the Armed Forces of the Central Pacific. The average strength of the theater increased 30 percent during 1943, and the area controlled was extended to include the Marshall, Gilbert, and Mariana Islands (fig. 223). Medical facilities were expanded to provide for task forces and garrison forces on newly occupied islands until the number of hospital beds in the Central Pacific was nearly twice that for the Hawaiian Department in 1942.

In providing logistic support for operations, it was the responsibility of the 5th Medical Supply Depot to equip the various divisions for amphibious operations. Each division was supported by one 400-bed field hospital and one provisional portable surgical hospital. Garrison forces were furnished with many hospitals, from a 2,000-bed general hospital to 100-bed station hospitals. A hospital ship, *The Mercy* (fig. 224), was converted from an ambulance-type ship to a surgical hospital ship.

Plans were worked out to insure procurement of medical supplies from the continental United States. Also, arrangements were made to ship directly to Saipan from the continental United States.

Medical supply activities were the responsibility of the 5th Medical Supply Depot, with teams of that organization dispersed throughout the theater. A total of 36 warehouses was occupied, although it was planned to



FIGURE 222. Expansion of Tripler General Hospital at Kanehama School. Note makeshift uncovered wood ramp.

centralize both storage and issue during 1944-45, since the tactical need for dispersion was past. Stocks were consistently rotated. A 195-day level of supply was maintained.

On 1 July 1944, CPBC (Central Pacific Base Command) was organized within and charged with the logistic support of USAFICPA. The immediate command and training of troops were delegated to major echelons of command. The headquarters became primarily a planning headquarters, coordinating the activities of these subordinate echelons.

On 1 August 1944, the USAFISPA (U.S. Army Forces in the South Pacific Area), formerly a separate area, came under the command of the USAFICPA and was redesignated SPBC (South Pacific Base Command). On the same date, USAFICPA was redesignated USAFPOA (U.S. Army Forces, Pacific Ocean Areas).

After the reorganization, most of the personnel of the Surgeon's Office remained in the CPBC with General King, including, as of 1 August 1944, Col. Kermit H. Gates, MC, deputy surgeon; Col. Walter S. Jensen, MC, consultant in aviation affairs; Col. Ashley W. Oughterson, MC, surgical consultant; Lt. Col. (later Col.) Moses R. Kaufman, MC, neuropsychiatric consultant; and Colonel Robertson and Major Young.

On 17 November 1944, Brig. Gen. John M. Willis became Surgeon, USAFPOA.

In addition to the consultants at Headquarters, USAFPOA, surgeons and consultants in the chief specialties were on duty with the Tenth U.S. Army:



FIGURE 223.- Medical Department ambulances awaiting the removal of casualties from the U.S.A.T. *William S. Clark*, Tanapag Harbor, Saipan, the Marianas, 27 April 1945.

the XXIV Corps; the 7th, 27th, 77th, 81st, 96th, and 98th Infantry Divisions; base commands; and Army garrison forces.

The forward areas at this time consisted of the following islands and were chiefly under Navy control: Kwajalein, Saipan, Guam, Tinian, Anguar, Makin, Espiritu Santo, Guadalcanal, and the Fiji Islands.

Army Garrison Force, Iwo Jima, was added to USAFPOA in February 1945, and Army Garrison Force, Okinawa, was added in April 1945.

On 25 April 1945, the Marianas, Iwo Jima, and the Palau Islands were consolidated into WPBC (Western Pacific Base Command), with Col. Eliot G. Colby, MC, Surgeon. In the middle of July 1945, the 821st Hospital Center arrived on Tinian in the Marianas, in anticipation of the assault on Japan. This center, consisting of 5 general hospitals with an authorized bed capacity of 5,000, was 40 percent completed when hostilities ended.

On 1 August 1945, Army Garrison Force, Okinawa, was transferred to the control of USAFWESPAC (U.S. Army Forces Western Pacific), with USAFPOA becoming USAFMIDPAC (U.S. Army Forces in the Middle Pacific). Army Air Forces, Pacific Ocean Areas, became Army Air Forces, Middle Pacific Area.

The Surgeon's Office, USAFMIDPAC, continued to increase in size and complexity. As of 1 October 1945, the following officers, among others, were

included: General Willis; Col. Arthur B. Welsh, MC, deputy surgeon; Col. (later Brig. Gen.) Elbert DeCoursey, MC, laboratory consultant; Col. John B. Flick, MC, surgical consultant; Col. Verne R. Mason, MC (fig. 221B), medical consultant; Lt. Col. William H. Everts, MC, neuropsychiatric consultant; Lt. Col. Charles F. McCuskey, MC, anesthesiology consultant; and Lt. Col. (later Col.) Edward J. Ottenheimer, MC, historical consultant.

Organization of Medical Services in the Middle Pacific

Responsibility for medical service in the Middle Pacific was delegated to five major echelons of command. The Commanding General, SPBC, was responsible for providing medical service to all units in his area during the roll-up of SPBC. The CPBC had a primary mission of administration to all units in the Hawaiian area and was responsible for furnishing medical services for Army garrison forces, reserve beds for battle casualties from forward areas, and medical supply support of combat operations. Headquarters, Army Air Forces, Middle Pacific, furnished and was responsible for medical services for all air forces in the Middle Pacific with the exception of hospitalization, which was the responsibility of the command in which Air Force units operated. The WPBC's responsibility for medical service was to provide for adequate hospitalization of casualties from combat zones and medical supply support for combat operations, including support to troops mounting from WPBC. Medical service at Okinawa was the responsibility of the Tenth U.S. Army. When the combat phase was completed, the Army Garrison Force, Okinawa, took over the medical responsibility for units in the Okinawa area.

At the time the medical service of CPBC was established, 10 August 1944, the following units were assigned: The North Sector General Hospital (formerly Station Hospital, Schofield Barracks), Oahu, T.H., Tripler General Hospital, Honolulu, T.H., 204th General Hospital, Oahu, T.H., and 147th General Hospital; the 22d, 129th, 165th, 266th, 284th, 289th, 290th, and 337th Station Hospitals; and the 31st, 36th, 38th, and 69th Field Hospitals.

During the following months, numerous medical units were assigned to the medical service of CPBC. Some of these belonged to divisions and other large units which were staging or training in Hawaii before going into combat. The medical units of these were given inservice training as part of their preparation for combat.

These units consisted of various station hospitals, medical service companies, field hospitals, portable surgical hospitals, malaria survey units, medical collecting companies, medical service detachments, motor ambulance companies, several general hospitals, and numerous other medical units.

Medical Activities and Expansion of Hospitals in the Hawaiian Islands

The history of the medical service of the U.S. Army during World War II began with the Japanese attack on Oahu on 7 December 1941. On that historic day, the medical officers of Tripler General Hospital, under the capable leadership of the chief of the medical service, took over the supervision of



FIGURE 224.—U.S.A.H.S. *Mercy*. A. Anchored in Tanapag Harbor, Saipan. B. State-room for officer patients.



FIGURE 224.—Continued. C. General Ward. D. Well-equipped laboratory.

all surgical wards and expeditiously organized and controlled the entire ward service for the preoperative and postoperative care of the wounded, thereby making emergency therapeutic measures quickly available to battle casualties. The medical service of the Station Hospital, Schofield Barracks, also acted as a supplement to the surgical service in triage and as a shock team in the treatment of the casualties from Wheeler Field and from Schofield Barracks. Subsequent history is one of rapid expansion of all the medical facilities in the Pacific area to permit proper care of the numerous sick and wounded who flooded the hospitals in the Central Pacific during the many operations following the declaration of war and up to the end of hostilities.

In the early part of 1942, Tripler General Hospital expanded to 1,000 beds, and its medical service was divided between two different geographic areas. One was located in the Kamehameha area and the other remained in the original Tripler area, opposite Fort Shafter. Each of these areas cared for certain categories of medical patients. The Station Hospital, Schofield Barracks, expanded from 422 beds to 1,000 beds, and the name was changed to North Sector General Hospital on 21 March 1942. This expansion was made possible by establishing a hospital annex 1 mile away from the main building, which provided five 100-bed wards for the medical service.

In June 1942, the 147th General Hospital arrived in the Territory of Hawaii and became part of the Hawaiian Department, thus increasing the bed capacity of the medical service of this area. It absorbed all the activities of Provisional Hospital No. 2, and it was set up at Saint Louis College, located in the southwest area of Honolulu. The medical service at the beginning consisted of 200 beds, but, on 7 December 1942, 500 additional beds were available for medicine, so that the total bed capacity ultimately approximated 700 medical beds.

In the absence of military operations at this time in the Central Pacific, all the medical services functioned largely as a medical screening facility for units staging in this area. The effect of training on limited-service personnel and relatively untrained troops threw a large burden on the medical service. The gastroenterologic section doubled its admissions, psychoneurosis became a problem, and respiratory infections became frequent but were not serious.

With the influx of troops for training in the Hawaiian Islands, additional hospitals arrived and were assigned duties on some of the outlying islands. The 1st Station Hospital arrived at Canton Island on 10 February 1942. On 12 March 1942, the 22d Station Hospital arrived at Kunului, Maui.

During the year 1943, preparations were made for the future campaigns in the Pacific. Changes in personnel were frequent, and medical officers were evaluated and trained by the medical services of the various hospitals for duties with troops in forward areas.

Medical screening continued through 1943. No sizable epidemics occurred. Contagious diseases were common among troops arriving from the continental United States. Scattered cases of typhus fever were seen during September and October of that year. There was no threat from anterior

poliomyelitis or influenza. Patients with malaria were seen frequently. These were usually cases of malaria with relapse which responded promptly to treatment. Malaria was never a problem in the Central Pacific. Patients with filariasis acquired in Apamama Atoll, Gilbert Islands, made their appearance in the Central Pacific, and a study of this disease on that island was made and reported.

On 1 November 1943, the 22d Station Hospital was reorganized and was designated as a 750-bed unit.

Tripler General Hospital continued to function as one of the most important general hospitals. Expansion continued, and Provisional Hospital No. 3 located at Kuakini was taken over by Tripler General Hospital and designated as the Contagious Disease Center for the South Sector of Oahu.

During the year 1944, there were many military operations in the Central Pacific Area. In the early part of the year, patients were admitted from the forward area (Kwajalein and Eniwetok), and during the summer the influx increased with activity on Guam, Saipan, and Tinian. With each campaign, because of the geographic location, interesting diseases (which will be described later) were seen in general hospitals.

As has been noted, CPBC was established on 1 July 1944 to include Canton, Christmas, Fanning, and Johnston Islands and all the islands of the Hawaiian group.

The training of Medical Department personnel, both commissioned and *noncommissioned*, progressed. The medical services continued to expand. Tripler General Hospital took over the station hospital at Kaneohe, Oahu, on 15 May 1944, thus increasing the medical service by three wards. In addition, two other wards were kept in reserve for medical emergencies. In August 1944, 115 patients with filariasis were evacuated to these emergency wards. The medical service in this area also served to segregate and treat minor outbreaks of diarrheal diseases occurring in the Kaneohe section of the island.

In September 1944, Tripler and North Sector General Hospitals were officially expanded each to 2,000 beds, were each allotted a staff of 80 officers, 166 nurses, 2 warrant officers, and 641 enlisted men, and were redesignated the 218th and 219th General Hospitals, respectively. The capacity of the 148th General Hospital, Oahu, T.H., was increased to 1,500 beds.

The increasing demands for medical beds on the outlying islands were met by the arrival of the 230th Station Hospital. This unit arrived on Oahu on 28 September 1944, and, after a short period at Koko Head Concentration Center, departed for Kamuela, Hawaii, on 17 October 1944. This hospital took over the functions of the 26th Station Hospital.

The increased activity as a result of the arrival of patients from forward areas necessitated the transfer of the 22d Station Hospital from Maui, on 21 September 1944, to Waipie, Oahu. The capacity of this hospital was increased to 1,000 beds, and it functioned as a general hospital, relieving the burden of the 218th and 219th General Hospitals.

Before the departure of the 22d Station Hospital, the 8th Station Hospital arrived on 19 August 1944 to take over the area about to be vacated. The 8th Station Hospital, which arrived on 12 February 1942, at Bora-Bora, Society Islands, was moved on 14 April 1944 to New Caledonia, and later in the year, on 2 August 1944, arrived for duty on Oahu.

During 1944, the incidence of respiratory infections was minimal. One convoy in June brought a severe strain of measles, but spread of the disease was prevented by segregation of the patients. With the capture of Saipan, there was an increase in cases of infectious hepatitis and also in patients convalescing from dengue fever. Intestinal parasites were common findings in patients evacuated from the forward area. Psychoneurosis continued to be a problem, and anxiety states and battle fatigue resulting from combat were frequently observed. Penicillin became available in April 1944 and proved to be an appreciable advance over other remedies, including the sulfonamide drugs. In the latter part of 1944, the Philippine campaigns (Leyte and Mindoro) added to the large number of patients already hospitalized in the Central Pacific.

In 1945, the military operations on Luzon, Iwo Jima, and Okinawa led to the evacuation of patients with diseases heretofore not seen in the Middle Pacific. Schistosomiasis and amebiasis (with liver complications) were encountered. The arrival of Japanese and Korean prisoners of war added to the array of tropical diseases. Cases of filariasis, paragonimiasis, and infestation with *Clonorchis sinensis* were seen. In addition, the Central Pacific received patients from New Guinea, New Caledonia, New Hebrides, the Russell Islands, Tahiti, the Cook Islands, and from similar small scattered areas throughout the Pacific.

On 1 March 1945, with the transfer of the 230th Station Hospital to Oahu, Tripler General Hospital transferred its Kaneohe medical facilities to this station hospital. On 1 February of the same year, the Kuakini facility was returned to civilians for use as a civilian hospital. An epidemic of influenza caused by virus B occurred on the island of Oahu, but it was not serious and with the help of civilian consultants from the continental United States was soon under control.

With the approach of V-J Day, preparations were made by CPBC to return to their original owners the public and private schools that had been used as military hospitals. As a result, the 147th General Hospital was transferred to Schofield Barracks on 25 August 1945. The medical service was established in one of the buildings that had formerly housed a general hospital unit.

The 218th General Hospital made similar plans to evacuate the Farrington area and to transfer its medical service from the Kamehameha area. The entire 218th General Hospital subsequently functioned in the original Tripler Hospital area until it moved into its new home, the New Tripler General Hospital.

The close of the war in the Pacific thus ended 3 years and 9 months of



FIGURE 225. —Occupational therapy at 204th General Hospital, Hawaii.

tremendous medical expansion, medical training, and treatment of the sick and the wounded.

THE MEDICAL CONSULTANT'S FIELD

In the great movement across land and sea, the place of the medical consultant was defined by his assignment to advise the theater surgeon on the quality of technical medical and sanitary services of all Army installations. His specific functions became clear in practice. Some idea of the geographic range of his activities in this area is indicated by the itinerary of Colonel Mason from April to December 1945.

From 4 to 26 April 1945, the 147th, 218th, and 219th General Hospitals and the 22d and 8th Station Hospitals were visited. Ward rounds were made with members of the staffs, the laboratories were inspected, and all internists and pathologists were assigned MOS (Military Occupational Specialty) ratings, where indicated, for final action by the Surgeon. Between 29 April and 4 May, Colonel Mason visited the blood bank, the 204th General Hospital (fig. 225), the 18th Naval Base Hospital, and the 289th and 373d Station Hospitals on Guam. On 7 and 8 May, he visited the 232d General Hospital, the 41st Station Hospital, and the 38th Field Hospital on Iwo Jima.

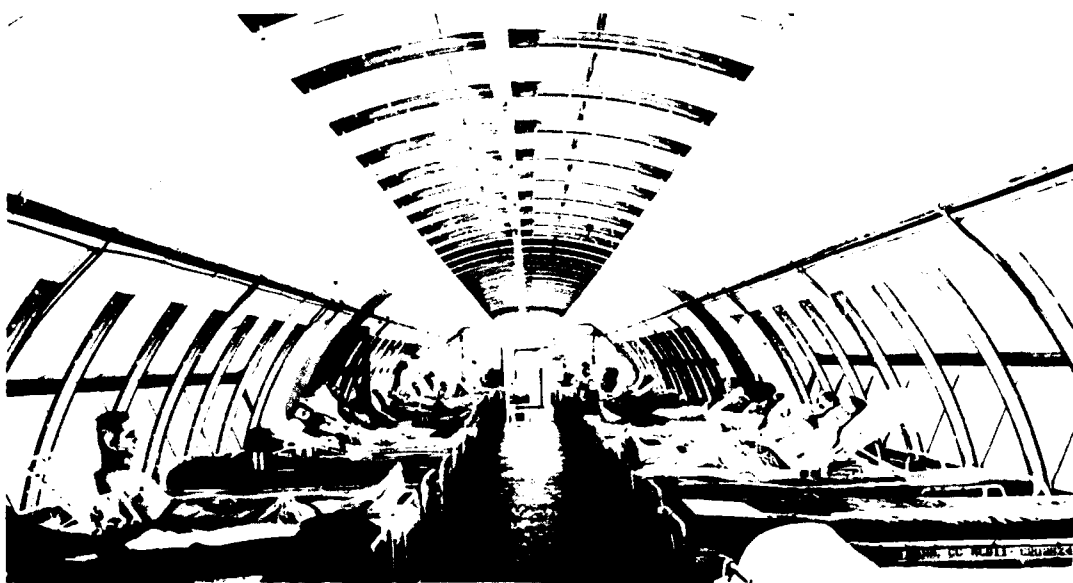


FIGURE 226.—Medical ward, 148th General Hospital, Saipan.

Between 11 May and 19 May, visits were made to the 148th and the 39th General Hospitals (figs. 226 and 227), the 5th Convalescent Hospital, the 94th Field Hospital, and the 369th Station Hospital on Saipan. Between 20 and 31 May, Colonel Mason visited medical installations on Okinawa. On 1 June, the 374th Station Hospital was visited on Tinian. On 20 July, the author went to Okinawa for 10 days to study Japanese B encephalitis; on 17 September, he went to Japan to study medical effects of the atomic bomb at Hiroshima; and on 6 December 1945 he returned to headquarters at Honolulu.

The professional medical consultant to an area, a theater, or a service command had many duties to perform during the period of hostilities. He gained much by the study of new methods, new therapeutic techniques, and new approaches to the study of disease. In certain instances, suitable data were available for the statistical approach to the solution of medical problems. In many cases, however, general impressions gained by study of large numbers of patients and by exchange of ideas with well-informed clinicians (fig. 228) had to be relied upon in making decisions.

When World War II began, the scope of therapeutic activity of the sulfonamides was not clearly delineated; penicillin was a novel product, so far untried; and plasma and type O blood had been administered by only a few. In addition, the civilian physician, except in a few instances, was not familiar by training or experience with the large number of diseases peculiar to the tropical and subtropical climates. Furthermore, at the onset of the war, the overall problem inherent in the relation of the supply of specialists of various categories to the demand for them in civilian practice and in the Army had to be resolved. For example, the number of psychiatrists, epidemiologists, and specialists in tropical medicine and in the control and treatment of contagious diseases was woefully inadequate to serve both the civilian and military popu-

lation. Accordingly, it was necessary to train Medical Corps officers in specialties required for military needs. This placed a peculiarly difficult burden on a large number of physicians who had to learn a new field of medicine, in which frequently they had no great interest, by means of short and intense refresher and training courses. The manner in which these problems were met deserves more recognition than these patriotic physicians will ever receive. The amazingly low morbidity and mortality in military zones occupied by U.S. troops showed how well the task of these officers was accomplished. The development of ideas and their application to the prophylaxis and treatment of disease in the Second World War fill a significant page in the history of medical science.

Fundamentally, military medicine is the practical application of medical knowledge to military needs. Of the contributions made to scientific medicine by Army physicians during the war, a few of the more important may be mentioned. The introduction of Atabrine (quinacrine hydrochloride) in malaria suppression, the use of penicillin in the treatment of gonorrhea, the use of sulfadiazine in the control and treatment of epidemics of meningococcal meningitis, and the investigations of acute rheumatic fever prove the value of the scientific in conjunction with the practical approach to medicine.

The Central and South Pacific Areas included the Hawaiian Islands, all of Micronesia, Iwo Jima, Okinawa and neighboring islands in the Ryukyu chain, New Hebrides, New Caledonia, the Fiji Islands, and the Society Islands. These islands are of variable origin, are variable distances from the equator, have diverse climates, and are populated by peoples of different races and different cultural levels. In addition, the arthropod vectors and transmitters of disease and the human carriers and reservoirs of disease in these islands of the Pacific Ocean are extremely varied. Many medical officers had the opportunity to observe a large number of exotic diseases and their effects on native populations and on military personnel who had entered areas of high endemicity. These diseases included malaria of all types, filariasis both periodic and nonperiodic, yaws, leprosy, scrub typhus, schistosomiasis, ancylostomiasis, amebiasis, leishmaniasis, Japanese B encephalitis, beriberi, protein starvation, dengue, intestinal helminthic infestations, and various types of blood-fluke infestations.

Since numerous data on many of these diseases are to be found in other volumes of this history, there has been no attempt at exhaustive discussion in this chapter. Rather, the diseases have been mentioned as they were seen in the hospitals of the Hawaiian Department and now will be discussed as they presented problems in the Central Pacific. Later will be mentioned more details concerning their course and treatment or their control and prevention.

MEDICAL PROBLEMS

Filariasis.—This is a disease of high incidence on Samoa, Bora-Bora, and also on Okinawa. Numerous troops who had contracted the disease in the



FIGURE 227. 39th General Hospital, Saipan. A. Tented annex. B. Panorama, area of permanent construction. C. Exterior, laboratory.



FIGURE 227—Continued. D. Interior, laboratory. E. Red Cross recreation room.

Society Islands were returned to the continental United States for treatment and observation. In general, their symptoms were mild. They often had some swelling of the inguinal nodes, often tenderness or pain along the spermatic



FIGURE 228. Medical officers on Okinawa, meeting to exchange ideas and discuss problems, May 1945.

cord, and usually a history of a few areas of retrograde erythema and induration. Diagnosis by finding the filaria in the lymph nodes or by finding microfilaria in the blood was extremely rare. The probable diagnosis was made by inference, after studying the patient and his symptoms and determining his previous geographic location. It was the policy of the Surgeon General's Office to transport soldiers who had acquired filariasis on a Pacific island to the continental United States for treatment. There was no valid reason to believe that the disease would progress or cause any appreciable disability if the patient was removed from an endemic area. The possibility that it might become established in the United States existed since the arthropod vector is present in many localities (fig. 229). In fact, the disease has existed in Charleston, S.C., for more than 50 years, and its appearance in some other area in the United States was, therefore, a remote possibility. The native Okinawan represents a huge reservoir for the spread of *Wuchereria bancrofti*. Surveys of the civilian population of that island and of Okinawan laborers taken prisoner during the military campaign proved that the microfilaria might be found in the blood at night in approximately 20 percent of the individuals examined. For that reason, Okinawan prisoners who had been evacuated to Oahu were returned from the Hawaiian Islands to Okinawa, and no other Okinawans were sent to



FIGURE 229. Experiment conducted at 249th Malaria Survey Detachment to determine the role of mosquitoes in the transmission of filariasis, Okinawa, July 1945. Containers house about 75 mosquitoes.

camps on Oahu. There is a small endemic area of filariasis on the windward side of Oahu, although the vector there is relatively inactive. Transmission of the disease to inhabitants of Oahu by military personnel has not been proved (p. 688).

Schistosomiasis. A number of patients who had acquired infection by *Schistosoma japonicum* during the Leyte campaign were hospitalized in Tripler General Hospital. These patients all had had fever, severe abdominal cramps, frequent vomiting or diarrhea, pain over the liver, and tenderness in the hepatic area. All had marked eosinophilia at this stage of the disease. One had severe headaches with optic neuritis, soft-tissue swelling about the right eye, and weakness of the extremities, especially the arms. They were all treated with Fuadin (stibophen), and all recovered. It is, however, too early to state what their ultimate fate may be. The prognosis, based on the probable length of life of the flukes in the blood is of some seriousness in these cases owing to late cirrhotic changes in the liver that often occur in patients who remain in endemic areas for considerable periods of time (p. 670).

Plague and leprosy. Plague is endemic on the island of Hawaii, but no instance of the disease occurred in any member of the Armed Forces (p. 667). Leprosy also occurs on the Hawaiian Islands. A few individuals with the

disease, all of whom were Asiatic in origin, were inducted into the Army and later discharged for disability.

Dengue.—Serious epidemics occurred in the Hawaiian Islands, in the Marianas, and to a small extent in Okinawa during the war (p. 678). The disease is of serious importance in military medicine owing to the large ineffective rate suddenly produced among troops and to a rather long convalescent period. Its control by aerial spraying of DDT (dichlorodiphenyltrichloethane) gives some foresight of the probable use of insecticides during future military campaigns.

Infectious hepatitis.—Acute catarrhal jaundice or epidemic hepatitis occurred in more or less severe epidemic form following nearly every minor or major campaign in this area. It presented the same clinical characteristics that have been described in other military campaigns and in this area had, apparently, no seasonal incidence. No convincing data have been found associating the disease with a known vector or a known reservoir. It has been proved that the excitant of the hepatitis may be present in the blood and the stools of patients who have recovered from it, but its natural mode or modes of transmission to human beings are not yet known. The disease never appeared in this area in large epidemics. No case following transfusion by type O blood had been reported during the early stage of the campaign; and later, with increasing use of transfusions, it was difficult to determine whether the hepatitis occurred naturally or following parenteral injections of serum (p. 667).

Dysentery.—Sporadic instances of amebic dysentery were seen in all the hospitals in the area. Studies of the location of the homes of these soldiers and surveys of the civilian populations in the neighborhood of the posts in the Pacific where patients had been stationed were of considerable importance in attempting to determine where the infection was acquired. However, it seemed reasonably certain that a considerable number of soldiers acquired amebic dysentery first in the Pacific area and that the disease will be of importance in the veterans' hospitals for years to come. No new drugs or new methods of treatment were developed in this area. The value of emetine in the acute stage of the disease and in the early stage of amebic hepatitis was amply confirmed.

THE ASSAULT ON OKINAWA

Medical Aspects, Particularly Shock

Extensive medical planning had been done for the Okinawa campaign.

Six hospitals, with a total bed strength of 6,650 were ready on Saipan alone to accommodate casualties from the operation. No major Army Medical Department organizations were staged on Saipan; however, nurses from the 69th, 74th, 75th, 76th, 31st, and 36th Field Hospitals were placed on temporary duty in Army hospitals on Saipan until such time as their transportation to Okinawa could be obtained. Medical supplies sufficient for 10,000 men for 30 days were set up in reserve for the operation but were not used.

Blankets, litters, pajamas, sutures, and dextrose, and certain other medical supplies, not available to the Navy base, were furnished Navy hospital ships and other surface craft. In addition, 1,274 Navy and 2,707 Marine patients were hospitalized in Army hospitals. On Guam, in turn, Navy hospitals accommodated 7,825 Army patients in the course of the Okinawa campaign.

The medical problems of a major campaign were observed during the battle of Okinawa. What follows are the personal impressions of Colonel Mason, who was director of a shock service during the First World War.

In 1917 and 1918, packaged type O blood was not available, and all blood for transfusions was obtained from soldiers or convalescent patients. It was matched by the use of stock sera of types II and III, and no serious results owing to possible mismatching were seen. Blood of group IV (type O) was given to any patient with no serious reactions. Sterile solutions of gum acacia were also furnished but were used in only a few instances. It was believed that the gum acacia was of little value in shock, and, in addition, it was highly pyrogenic. By the end of the First World War, the value of the use of whole blood in shock following either trauma or hemorrhage was well established. At that time, it was known that plasma escaped from the blood vessels, capillary stasis occurred, blood volume was reduced, and hemoconcentration occurred in secondary shock. It was not fully realized, however, that whole blood was the best colloidal solution known to replace lost blood or to restore blood volume.

At the beginning of the Second World War, there were still many unknown factors concerning shock. It was the accepted belief that adequate quantities of plasma could be substituted for whole blood in most cases. This opinion was based on experience in the use of plasma in burns and in shock following surgical operations when the loss of blood was not great. Early reports from the campaigns in Africa, Italy, and Europe did not substantiate this belief, and further reports by many observers showed that battle casualties reaching a hospital in shock (excluding those with lesions of the nervous system) had lost quantities of blood much larger than had previously been suspected and that plasma was far inferior to whole blood in their treatment. As suggested by that experience, blood of type O was collected on the Pacific Coast of the United States and transported by airplane directly to Okinawa, after re-icing at Oahu and Guam. Thus, adequate quantities of type O blood were available at all times.

In modern warfare, if battle casualties received early are to be treated adequately, the organization and equipment of field, evacuation, and station hospitals, as originally authorized in World War II, must be altered. Training in the parenteral administration of whole blood and in all aspects of shock should be given to at least 3 or 4 shock teams. Each team should consist of a trained internist, a laboratory officer, an assistant competent to use the copper sulfate method to determine specific gravity of the whole blood, and also several nurses. The treatment of shock is not necessarily the function of the internist, but under battle conditions it is almost invariably true that every

available surgeon is overloaded with work in the operating room. It is also the usual opinion that a competent internist familiar with laboratory methods is the most satisfactory chief of the shock service. In field, evacuation, or station hospitals near the scene of battle, a shock ward, completely equipped, should be established by trained personnel, and all patients in shock or with serious wounds should be admitted to that ward. Each patient should be examined, the blood pressure taken frequently, and the specific gravity of whole blood and plasma determined as necessary. Careful records should be kept, especially of all tests and all administrations of fluid.

In general hospitals, a shock ward is seldom necessary although shock teams should be formed to treat patients in shock in any ward throughout the hospital.

During an active campaign, it is desirable to delegate the responsibility for the early care of wounds of the chest and lungs to a medical officer especially trained in that field or to the chief of the shock service, if no other officer is available. Careful study of the fluid from the wounded chest by the copper sulfate method and bacteriologic examination will often give data of great value in the treatment of thoracic injuries.

When blood is plentiful, as during the campaign on Okinawa, overtransfusion becomes a possibility. It was the impression that in a very few patients this may have been the cause, or, at least, a contributing cause of death. On the other hand, there is no doubt that a very large number of lives were saved by large, repeated transfusions (fig. 230).

The indications for the use of intravenous crystalloid solutions are not frequently met in war injuries under usual conditions. They may present themselves in patients in hot and humid areas, when thirst and sweating have been excessive or occasionally after repeated vomiting. Otherwise, crystalloid solutions should be used cautiously and usually only when whole blood is either unavailable or available only in small quantity.

Shock teams and the shock ward in the field hospital

The varying degrees of mobility of modern warfare will often alter considerably the function of the field hospital. The usual channel of evacuation of the wounded is from the aid station to the collecting and clearing stations and then to the evacuation hospital or field hospital functioning as an evacuation hospital. The wounded patient in shock must be treated at the earliest possible moment if he is to be saved. Shock treatment consists of the control of hemorrhage, the closure by some method of sucking wounds of the chest, the proper fixation of wounded extremities, the relief of pain, the administration of parenteral fluids, and often the administration of oxygen. The wounded patient, having received this care and having been properly prepared for operation, is now transferred to the surgical service. Following operation, the patient, in many instances, is returned to the shock ward for postoperative care or to the general surgical wards if or when it is probable that shock is under



FIGURE 230. The splash of whole blood during application of a transportation plaster cast, Okinawa, 9 April 1945.

control. In the latter case, symptoms of shock may reappear, and if so the patient may be treated in the surgical ward.

Thus, the shock service will be called upon to initiate treatment of shock, to control triage of patients, and to assist in all postoperative care. For this reason in field hospitals, the admission ward, the shock ward, the laboratory, the X-ray department, and the surgical facilities should be contiguous when possible.

In the Pacific area, land warfare up to the end of the war had not been extremely mobile. There was reason to believe that, even in the event a land attack were made on the Japanese mainland, warfare would not have been of the mobile type common in Europe. The reasons were relatively obvious. The Japanese islands are small, the roads were mostly unimproved, and the terrain in many places is rough. The Japanese armed forces were not well supplied with vehicles or mobile weapons. Furthermore, the U.S. air superiority would undoubtedly have seriously disrupted all types of communication behind the lines. The Japanese foot soldier had shown that he would stand and fight where he was rather than attempt strategic withdrawal in his relatively small mainland. It seemed likely, therefore, that in the event of land campaigns on the mainland, as in the campaign on Okinawa, most of the surgical treatment would be done in evacuation or field hospitals (fig. 231). Moreover, it seemed likely that, in general, the distances between aid stations and evacuation or field hospitals would not be great. Thus, it was probable that shock wards



FIGURE 234. 69th Field Hospital, Okinawa, May 1945.

in the evacuation or field hospitals would be sufficient, as a rule, but that, occasionally, shock teams should be formed or made available in the clearing stations.

In each hospital, every medical officer should be familiar with the copper sulfate method of examining blood, with the use of oxygen, with the use of whole blood and plasma, and with the use of crystalloid solutions. At least 3 or 4 medical officers in each hospital should know all the important details of the use of the copper sulfate method, and as many technicians should be trained in its use. An officer should be trained in the general principles of treatment of thoracic wounds and should be especially skilled in thoracentesis for the evacuation of blood, fluid, and air and for the relief of tension pneumothorax. In general, these procedures will be carried out in the shock ward where the patient can be examined readily by the surgeon, who may decide when thoracotomy or other thoracic operations seem indicated.

Shock as a problem in military medicine

Many changes are still taking place in the medicomilitary conception of shock. Discussion will be limited to certain phases of the resuscitation of battle casualties, chiefly those produced by trauma. It will be confined almost entirely to the procedures that proved efficacious in the shock wards during World War II.

Relatively minor trauma with the loss of little or no blood and with only a reasonable amount of pain may produce psychic shock or benign shock. Pallor, cold sweat, faintness or unconsciousness with sudden drop of blood pressure are the usual symptoms. The relief of the pain by morphine without any other treatment usually leads to rapid vasomotor stabilization and prevents return to a state of serious shock. For that reason, relief of pain is of great importance therapeutically. In many wounded patients, however, the effects of exhaustion, dehydration, and blast injury may not be readily apparent. As a consequence, the patient's condition may be more serious than the size or location of the wound would indicate, and what was considered to be benign shock may progress rapidly into a state of profound shock.

Surgical shock produced by operations under prolonged anesthesia but without significant loss of blood is characterized by peripheral vasoconstriction, with cold, cyanotic extremities; anoxic anoxemia from the vasoconstriction accompanied by marked hypotension; leakage of protein into the tissues, probably due to anoxic damage of the capillaries; reduced left ventricular output, pulmonary hyperemia; and eventually pulmonary edema. It has been amply proved that this type of shock may be reversed promptly by administration of sufficient quantities of plasma. Experience has shown that, when moist rales are heard in the lungs, the plasma should be given slowly in more concentrated form; namely, from 2 to 3 units to 250 cc. of diluent. In all types of shock, plasma may be given early at aid, collecting, or clearing stations where whole blood is not available, but it should be remembered that it may give a false impression of security by causing a temporary rise in blood pressure in patients who may have had severe hemorrhage and in whom only blood will be effective.

Patients with extensive burns should receive plasma in concentrated solution given slowly. Since many of these patients may have inhaled hot gases or fumes, the administration of oxygen may be important.

The patient with extensive single or multiple wounds almost without exception has lost a large amount of blood before he reaches the field hospital. Direct measurement of blood volume is not yet feasible in the battle zone, but there is much indirect evidence of importance. In one instance, the calculated amount of whole blood lost by 20 casualties having wounds not involving abdominal or thoracic viscera averaged 50.4 percent of the total blood volume, and the blood loss in 16 cases with perforating abdominal wounds averaged 24.4 percent. These figures at first sight seem excessive. However, in many wounded patients observed 2 to 4 hours after injury, hematocrit readings were 30 to 35 and would have been much lower at the end of 48 hours or later. Some of these patients followed through to rear areas still had hematocrit readings of 25 or lower after 2 or 3 weeks and after a number of subsequent transfusions. Early drop in the specific gravity of the whole blood, as determined by the copper sulfate method, together with drop in blood pressure and acceleration of the pulse are usually reliable signs that the blood loss has been considerable.

In another instance, it was reported that systolic blood pressures of from 50 to 60 mm. Hg were very common in the severe cases. The general rule of fast transfusion in these cases was adopted, and blood or plasma was administered at the rate of 1 pint per 15 minutes until the blood pressure reached 110 mm. Hg. This was followed by a slower rate—1 pint in 45 minutes—until the blood pressure had been completely built up. It was found better, in general, to leave the badly shocked patient with penetrating wounds of the chest alone, and very few of these patients were transfused. In the most severe cases, slow transfusion was attempted. With head wounds, a similar conservative policy was adopted. It was evident in patients either with cranial or spinal wounds that transfusion was singularly ineffective when there was much hemorrhage or gross tissue destruction.

On the average, the casualties observed by Col. Walter B. Martin, MC, Consultant in Medicine, Tenth U.S. Army, received 3.5 pints of blood or about 12.5 percent of their blood volume. In spite of the large number of transfusions given to wounded men on Okinawa, few were seen with polycythemia or other evidence of overloading of the circulation. This theoretic possibility may be disregarded, except in certain types of injuries such as those just noted. If available clinical signs point to severe loss of blood, 10 or more pints of whole blood may be given preoperatively and postoperatively in from 24 to 36 hours without any evidence of injury to the patient.

It is the conviction of most medical officers who have been in charge of shock wards that large quantities of whole blood given to seriously wounded men before, during, and after operation are of the utmost importance in reducing the death rate both from hemorrhage and from irreversible shock. Excessive amounts should not be given, and transfusion should not be repeated after the hematocrit readings have returned to normal.

The complicated vasomotor, osmotic, and fluid correlations in shock are not yet entirely known, and in some instances results of laboratory determinations are interpreted differently by different observers. A few physiologic principles on which all observers are agreed are applicable in shock wards in advanced medical installations. The following relatively simple observations should be of value in reaching a decision as to what parenteral fluid should be given and why:

1. With minor wounds, sudden collapse of the nature of fainting is frequent. This consists of pallor, cold sweat, extreme muscular weakness, marked drop of blood pressure, and anoxic anoxemia with some cyanosis. The hematocrit reading and blood counts are normal. The phenomenon under these circumstances is caused by widespread vasodilatation of central origin with consequent cerebral anemia.

2. Shock without hemorrhage or with insignificant loss of blood is frequent. Under such circumstances, the hematocrit reading is high, owing to loss of protein into the tissues through the proximal arterioles and veins. There is widespread vasodilatation and probably damage of the smallest vessels due to anoxic anoxemia from blood stasis. The blood pressure falls,

sweating is profuse, blood pools or sludges in mesenteric and pulmonary veins, and ventricular output steadily diminishes. Pulmonary edema is a terminal event in this type of severe shock, or in irreversible shock.

3. Shock with hemorrhage is the common event in wounded soldiers. Ample experience has shown that in such instances the hematocrit reading is low even within the first 3 hours after the wound has been inflicted. Since uncomplicated shock and dehydration lead to high hematocrit readings, a low reading shortly after a wound has been received means that the blood loss certainly has been very large. Under such circumstances, sound clinical judgment must be used. The amount and speed of whole blood transfusions should be determined by clinical observation, blood pressure determinations, and frequent counting of the pulse. Plasma in more concentrated form than usually used may be helpful if blood is not available. The sovereign remedy is whole blood. An attempt should be made to replace any loss by hemorrhage as quickly as possible. Having accomplished this as nearly as can be determined by clinical observation and hematocrit readings, the condition of the patient should be reevaluated with great care. An excessive number of erythrocytes in the peripheral blood stream will produce erythema, not cyanosis. If the blood pressure remains low, if cyanosis appears and the urinary secretion rapidly diminishes, the patient is usually in irreversible shock. Examination will usually detect rales of pulmonary edema, and at this stage further whole blood transfusion will produce increased evidence of right heart stasis. At autopsy, these patients show pulmonary congestion, visceral congestion, renal cyanosis, and fluid in the serous cavities. It is probable that in few, if any, of these patients overtransfusion played more than a minor role in their death. In patients with hemorrhage and shock not markedly improved by whole blood transfusions, other causes for persistent shock should be sought with great care. These include concussion injury of lungs, crushing injury of muscle, infarction of a large mass of muscle, unsuspected injury of the spinal cord, and fat emboli from injury of long bones and from extensive tearing injuries of the abdominal viscera.

Shock is a name applied to a series of phenomena that are harbingers of approaching death. The terminal events in shock are probably always similar, regardless of the cause or of the speed with which they are elaborated. These events are modified and modulated by the underlying disease or injury. Shock produced by streptococcal disease, by Addison's disease, by hemorrhage, by extensive surgery, by burns, or by gangrene of an extremity probably follows the same pattern; and laboratory determinations that seem to show serious discrepancies from case to case may be correlated when the pathologic physiology of the underlying disease is carefully considered and fully understood. Shock produced by a burn, by a crisis of hypertension caused by a pheochromocytoma, or by a prolonged surgical operation all eventually produce vasodilatation, hemoconcentration, anoxic anoxemia of the smaller blood vessels, osmotic imbalance in tissues with imbibition of water, drop of blood pressure, and disturbances of renal function owing to hypotension and renal

cyanosis. The end results are pulmonary edema, then cerebral anemia and death. In many cases, the alterations of clinical findings and laboratory determinations are easily understood when compared with such abnormalities already present when clinical evidence of shock appeared.

The use of parenteral fluids, other than whole blood or plasma, in the treatment of wounded patients requires brief discussion. Before a battle casualty is given a parenteral injection of fluid other than blood or plasma, a definite indication for its use must exist. A number of such indications may be enumerated, such as alkalosis caused by vomiting and diarrhea; mild acidosis from starvation; anuria from hemoglobinuric or myoglobinuric renal damage; edema from hypoproteinemia following blood loss, malnutrition, or extensive burns; or change in electrolytic balance owing to fistulas from the stomach or small intestines. Most of these conditions are encountered rarely in active campaigns or in battle casualties and the indications for treatment are obvious. Such treatment, however, usually is of great importance. It has been repeatedly observed in hospitals that following serious wounds the patient loses much weight. This loss of weight is not always easily explainable. In general, it is a result of weakness, loss of appetite, unattractive or liquid diet, and loss of serum from infected or burned areas. Every effort should be made to feed such patients nutritious diets with ample protein. The routine use of liquid diets should be discouraged, and such diets should be given only to patients who are too weak to chew. All foods except milk become liquids in the stomach. Proper postoperative feeding will save many hospital days.

The treatment of wounds of the chest, except for the actual surgical operation and the postoperative care of casualties requiring thoracotomy, should be largely delegated to the shock teams except in those field hospitals that are augmented by thoracic surgical teams. The first consideration is the closure of sucking wounds of the chest and the arrest of hemorrhage by the best method available. The next is the careful and early diagnosis of the extent and nature of the wound and the determination of the intrathoracic changes. Early radiographic diagnosis is usually possible and always important. Hemothorax should be removed by early and frequent tapping. Pneumothorax, especially of the tension type, should be corrected by the use of a needle connected to a one-way valve, either the valve from a gas mask, or a piece of rubber glove correctly placed over a thoracentesis needle, or a Bunsen valve. All pleural fluids should be studied by the copper sulfate method, and, when possible, the fluids should be examined for cellular content and for micro-organisms. A careful study of the movements of the thoracic cage should be made to determine whether the wounded half is carrying on any respiratory function. Massive coagulation of the blood in a hemothorax is probably much more frequent when the respiratory muscles on that side are reflexly paretic. Massive coagulation of a hemothorax should lead to prompt thoracotomy, since when not evacuated it is followed by either empyema or constricting pleural fibrosis, necessitating a long period of hospitalization.

Oxygen should be given to all patients with thoracic wounds when there is cyanosis, or when moist rales are heard at the base of the lungs, or when a satisfactory airway cannot be established. Such patients should never be given large or rapid transfusions, since these may produce acute pulmonary edema in cases in which the amount of pulmonary compression is extensive. As a matter of fact, any fluid given intravenously should be administered with great caution to patients who have had serious thoracic wounds.

Pathologic evidence of pulmonary edema

This discussion is based on 100 autopsies performed at the 14th Medical Laboratory on Okinawa on soldiers who died of battle wounds or severe injuries.² In reviewing these records, one is immediately struck by the high percentage (72 percent) of cases showing massive pulmonary edema with or without pleural effusion and the considerable number with hemothorax and atelectasis that apparently had escaped detection during life. With few exceptions, these individuals had experienced severe tissue damage of the head, chest, abdomen, extremities, or combinations of these. Fifty-one percent had multiple major wounds. Table 2 gives the details on each case as to location of wounds, presence or absence of pulmonary edema, pleural effusion, atelectasis, hemothoraces, empyemas, and pneumonias.

Table 3 shows the relative weight of the lungs and liver in edematous and nonedematous cases exclusive of those showing pneumonia. It is evident that the weight of these organs in many of the patients with no pulmonary edema are above the accepted normals, suggesting that in some cases edema of the lungs was actually impending.

Satisfactory evidence cannot be brought forward to establish the cause of the remarkable incidence of pulmonary edema in this group. The inference is strong, however, that it is the result of the quantity or kind of fluids given intravenously or the rate at which such fluid was given. Unfortunately, accurate records of fluid intake and output are not available. In a number of patients, the amount of parenteral fluid given was certainly excessive, as was also the amount of sodium chloride. Some patients received, during their period in the hospital, approximately 62 gm. of sodium chloride parenterally. In addition to this, a large number of wounded men also received large quantities of blood. It is probable that these two factors may have been contributory to the production of pulmonary edema, particularly if the serum protein had been lowered by blood loss and subsequent dilution with crystalloid solutions.

The conditions under which the shock wards operated during the rush days of the campaign amply justified a wide margin of error in maintaining fluid balance and in keeping satisfactory records. Large numbers of severely wounded patients crowded the shock wards day and night. It was necessary to place great emphasis on speed and on the rapid administration of large quantities

² Essential Technical Medical Data, General Headquarters, USAFPAC, for September 1945, Appendix A, thereto. (These data were in large part collected by Col. Walter B. Martin, MC, or under his supervision while he was medical consultant for Tenth U.S. Army.)

TABLE 2.—Autopsy reports—100 casualties dying from battle wounds on severe injuries

Autopsy number	Type of injury ¹						Amount of fluid in pleural cavities		Weight of organ			Pathologic changes ²								
	Head	Neck	Chest	Abdo- men	Trunk	Extrem- ity	Crush	Blast	Right side	Left side	Right lung	Left lung	Liver	Hemo- thorax	Pleural effusion	Atelec- tasis	Emphy- sema	Pneu- monia	Pulmo- nary edema	Perito- nitis
1						L			Cc.	Cc.	Gm.	Gm.	Gm.		X				(**)	
2						L			500	300	1,350	1,300	1,640						(*)	
3			L	L							700	750	1,500							X
4		L									400	350	1,720							
5				L							350	325	1,925						(**)	X
6				L	L						800	1,100	1,925						(**)	X
7				L	L	L					750	800	1,925			X			(**)	
8			L	L		L			2,000		650	925	2,200							X
9			L	L		L				500	750	500	1,725		X		X	(*)		
10				L							475	425	2,425							X
11			L						100	1,200	725	650	2,025	X		X			(**)	
12			L						2,000		500	650	1,825	X		X			(*)	
13			L						1,200	1,500	500	650	2,100		X		X		(*)	
14		L									550	425	2,200							
15			L								525	600	1,750	X		X				
16											575	300	1,725				X		(*)	
17			L						100	2,200	750	500	1,975	X					(*)	
18			L		L				100	100	875	775	1,700		X				(*)	X
19						L					650	575			X				(**)	
20							L		200	200	850	1,150							(**)	
21			L						1,000	800	550	600	2,500	X			X		(*)	
22			L							2,400	800	1,175	2,000	X			X		(**)	
23			L	L							475	450	1,975							
24		L	L	L					1,400		825	750	2,025	X			X		(**)	X
25						L			600	600	1,275	1,275	2,625		X				(**)	
26											825	780	2,300						(**)	
27	L		L	L		L			100	100	550	550	1,400					(**)		
28											475	475	1,600							
29	L			L							1,000	850	2,000		X				(**)	
30						L			100	100	975	1,025	1,725						(**)	
31						L			200	200	700	875	2,300		X				(**)	X
32				L		L					500	500	2,025						(**)	X
33				L							625	1,025	1,750	X		X			(**)	
34			L			L				1,000	350	300	1,550			X				
35																				
37																				

TABLE 2.—Autopsy reports—100 casualties dying from battle wounds or severe injuries—Continued

Autopsy number	Type of injury ¹						Amount of fluid in pleural cavities		Weight of organ		Pathologic changes ²									
	Head	Neck	Chest	Abdo- men	Trunk	Extrem- ity	Crush	Blast	Right	Left	Right lung	Left lung	Liver	Hemo- thorax	Pleural effusion	Atelec- tasis	Emphy- sema	Pneu- monia	Pulmo- nary edema	Perito- nitis
									side	side										
105			L			L				4,000	750	550	1,725	X		X			(*)	
106		L			L						1,000	875	2,750		X				(*)	
107			L	L					850	450	800	725	2,100	X	X				(*)	
108				L	L				400	400	1,000	800	2,450		X				(**)	
110			L						675	450	950	800	2,000	X					(**)	X
111				L		L			200	200	1,050	875	1,825		X				(**)	X
112											325	300	1,550						(**)	
114				L		L					575	450	1,550					(*)	X	
115	L				L	L					1,100	800	1,750					(**)		
116			L	L					1,800	1,400	900	725	2,150	X				(**)		
117					L	L	L			1,200	575	550	1,525	X		X				
118						L					1,125	1,050	1,175						(**)	
120			L	L		L					750	850	1,600						(**)	X
125		L				L				200	800	650	2,100		X			(*)		
129					L				100		500	450	1,400					(*)		
130							L				1,250	550	1,775					(**)		
131	L										825	650	1,775					(**)		
132	L					L				100	950	1,200	2,250		X			(**)		
133				L					100	1,400	1,250	1,000	2,250		X			(**)		X
134											875	750	1,525					(**)		
139	L								200	250	900	750	2,250					(**)		
140				L		L					750	500	2,025					(**)		

¹ Location of injury designated by "L."² Presence of hemothorax, pleural effusion, atelectasis, empyema, and peritonitis designated by "X."

Degree of pulmonary edema designated by—

*** severe—average weight of both lungs 2,128 gm.

** moderate—average weight of both lungs 1,607 gm.

* slight—average weight of both lungs 1,111 gm.

Degree of pneumonia designated by—

** moderate.

* slight.

TABLE 3.—*Weight (grams) of lungs and liver in 100 autopsied wounded (excluding pneumonia cases) with and without pulmonary edema*

Casualties	Right lung		Left lung		Liver	
	Average	Maximal	Average	Maximal	Average	Maximal
With edema	839	1, 400	768	1, 300	1, 975	2, 750
Without edema	505	925	455	700	1, 840	2, 525

of blood to as many patients as possible. The medical personnel available in the preoperative and postoperative shock wards were inadequate in number and, with certain exceptions, inadequately trained. The surgical teams were overloaded with urgent operative cases and had little time to supervise the postoperative care of their patients. Too much cannot be said in praise of officers and enlisted personnel of these hospitals for their devotion to their patients. They worked to the point of exhaustion through many days and nights. It is obvious, however, that a number of patients suffered from a lack of individual attention.

Summary

The brilliant achievement of making adequate amounts of whole blood available for the treatment of shock in the evacuation and field hospitals and clearing stations brought an added responsibility to the shock service. In the campaign on Okinawa, for the first time in any area in the Pacific, more than sufficient amounts of blood were available, this being, in general, type O blood which had been flown in large amounts from the continental United States. Many lives were saved by the liberal use of whole blood. In the future, it will be more than ever necessary that shock wards be set up on a basis adequate from both the physical and professional standpoints.

Medical experience in the campaign on Okinawa was more favorable than was anticipated owing to a number of factors. Although the number and types of medical units were often inadequate to accomplish the mission of the medical service in the most acceptable manner, excellent use was made of the facilities available both in planning and in operation. In general, however, the organization and training of field hospitals as professional units were incomplete, and the shock service, especially in field hospitals, was deficient in organization, training, and in qualified personnel. Laboratory support, both from the field hospital laboratories and the more complete Army medical laboratory, was inadequate chiefly owing to lack of trained personnel and to failure to anticipate the added burden placed on field hospitals by modern warfare.

The evacuation from the island of many "white" (i.e., transportable) medical and surgical patients was a significant factor in loss of manpower, since many of those with only slight wounds might have been returned quickly to duty.

In 100 autopsies performed on soldiers who died of battle wounds or severe injuries, 72 percent showed massive pulmonary edema with or without pleural effusion or hemothorax. It is probable that death in these instances was caused almost invariably by irreversible shock, and it is believed that the pulmonary edema may have resulted in part from the quantity or kind of fluid given intravenously or the rate at which such fluid was given.

It was not proved that any patient died solely as the result of overtransfusion or of drowning by the parenteral administration of crystalloids. Furthermore, it is not believed that death in the patients with acute pulmonary edema combined either with pleural effusion or hemothorax was due to these circumstances alone. Since it is more probable that death under such conditions is caused by irreversible shock, it is not logical to conclude that these patients would have been saved had they not been given large quantities of whole blood or, occasionally, of parenteral crystalloid solutions. On the contrary, many lives probably were saved. Large quantities of blood by transfusion at this time was the only known remedy that might prevent the development of irreversible shock.

Observations by the Medical Consultant to the Tenth U.S. Army

Following are comments taken from the report of Colonel Martin on the operations of the Medical Department of the U.S. Army during the campaign on Okinawa. It may be noted that elaborate preparations for evacuation of the less severe transportable cases are described as necessary to conserve for the care of the severely wounded not only beds but Medical Department personnel, who were, in fact, in short supply at Okinawa. On the other hand, accumulated experience elsewhere has shown that the time and talents of medical personnel are expended profitably on the patient who can be treated near the front and returned promptly to duty. An essential part of planning should be to provide an adequate supply of medical officers to care for such patients as well as for those in urgent need of surgery.

On L-day (the day of the amphibious assault on Okinawa), 6 April 1945, the surgical, medical, and orthopedic consultants came ashore. Colonel Martin remained with the Surgeon, III Amphibious Marine Corps, and they had the opportunity to visit together the field medical installations in the forward areas. It should be remembered that the assault on Okinawa (fig. 232), which began on 6 April 1945, was unopposed by the Japanese and that there were no actual casualties at the time of landing. Shortly afterward, however, heavy battle action began and continued until the mopping up of the Japanese forces about 21 June 1945. On 14 April 1945, Colonel Martin returned to the headquarters of the Tenth U.S. Army and thereafter was concerned, together with the other consultants, with the professional activities of the medical units supporting the operation of the Tenth U.S. Army in southern Okinawa.

On L-day, the consultants visited six of the LSTH's (landing ship tank hospitals) supporting the III Amphibious and XXIV Corps. Although the number of casualties at that time was light, it was evident that the plan of



FIGURE 232. Landing operations on Okinawa, 4 April 1945.

evacuation was well conceived and was working satisfactorily. This impression was confirmed by subsequent observations. The pontoons alongside these ships afforded ample space for rapid sorting of the casualties and thus facilitated their transfer to AH's (hospital ships) and APA's (attack transports). It should be noted that beginning L-day the LSTH's for the III Amphibious Corps had been provided with additional surgical personnel of the landing force by the corps surgeon. This would have been of inestimable value if the casualties had been heavy early in the campaign. In the latter phase of the operation, an army surgical team was assigned to one LSTH, used for evacuation of casualties from the south end of the island. This step proved of great value and should be considered if similar circumstances arise in future operations. Air evacuation began on L-plus 8 and functioned smoothly and efficiently. Holding stations were established on the beaches and at the Yontan Air Field. At these points, patients were carefully screened as to suitability for transport by air or by water. The combined effect of air and water evacuation prevented the hospitals from being overwhelmed by "white" (i.e., transportable) cases, surgical and medical, at a time when battle casualties were heavy. Later, evacuation was effected directly to LSTH from certain of the northern and southern beaches. During the action in the south of the island, when transport to any field hospital was made difficult by bad roads (fig. 233), evacuation by light Army aircraft (L-5's) was successfully carried out.



FIGURE 233. Clearing station of 102d Medical Battalion, from which casualties were evacuated to 31st Field Hospital, Okinawa, 21 April 1945. Note dirt road in background.

Disease did not constitute a major problem, but there were large numbers of battle casualties (table 4). This placed a heavy load on the preoperative and postoperative shock teams as well as on the operating teams. It was necessary and proper that officers from the medical service of the hospitals be used in the shock wards. Owing to the fact that, in general, shock teams had not been organized or instructed in shock therapy or in the proper physical setup and operation of a shock ward, there was at first considerable confusion and lack of effectiveness. These deficiencies were gradually corrected. As each new unit arrived on the island, the professional personnel were briefed by the consultants on the various professional aspects of the operation. In addition, the plan of attaching these officers to units already operating served to give them invaluable training in field medicine and surgery.

It was necessary during this period of great activity to evacuate without definitive treatment, directly by ship or plane, 5,175 of the less severely wounded. Those in the group requiring debridement were evacuated to AIF's or APA's. This policy allowed the available surgical personnel time in which to care for the severe nontransportable cases. At the same time, large numbers of "white" medical casualties were evacuated from the field hospitals in order to clear beds for the severely wounded. Even then, the situation was saved only by the assignment of the professional personnel of newly landed units to

TABLE 4.—*Weekly disease and battle-casualty rates, during assault on Okinawa, 6 April through 22 June 1945*

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of cases per annum per 1,000 average strength]

Week ending—	Disease		Battle casualties	
	Number of cases	Rate	Number of cases	Rate
6 April.....	129	66.36	1,169	601.36
13 April.....	296	152.23	2,027	1,042.66
20 April.....	293	151.44	2,507	1,296.08
27 April.....	323	188.01	2,310	1,344.83
4 May.....	467	360.15	1,643	1,267.11
11 May.....	358	288.66	1,391	1,121.64
18 May.....	557	437.79	1,882	1,479.36
25 May.....	586	462.59	1,693	1,336.47
1 June.....	857	651.40	854	649.16
8 June.....	840	643.94	620	475.35
15 June.....	822	653.98	886	704.95
22 June.....	913	731.60	1,326	1,062.60

units already in operation. On an average, these additions increased the professional personnel of the operational field hospitals from 13 to 22.

The Surgeon, Tenth U.S. Army, placed the responsibility for the utilization of available professional personnel entirely in the hands of the various consultants. Excellent cooperation was given by the corps and division surgeons and, in most instances, by the hospital commanders.

Medical casualties were light, with few seriously ill, and constituted, during the first 6 weeks of the campaign, approximately one-sixth of the total casualties. Thereafter, there was a gradual rise in the disease rate which on 28 May 1945 for the first time exceeded the battle-casualty rate. At the same time, battle casualties were diminishing, so the increase was more relative than absolute. The low medical rate had not been anticipated and may have been due to several factors, to be discussed later.

The quality of medical care varied in proportion to the devotion to duty and professional qualifications of the medical staff. In certain instances, the professional qualifications of the medical officer assigned had been below a reasonable standard or the organization of the service had been deficient. In most instances, the medical care was from good to excellent.

An advance unit of the 14th Medical Laboratory consisting of 3 officers and 8 enlisted technicians was landed on L-plus-8-day and was in operation on L-plus-21-day. Owing to limitations on tonnage allowance, a relatively small amount of equipment could be brought in. This unit performed valuable service in support of the field hospitals in the accumulation of factual data on diseases prevalent among the natives. Of especial value was the



FIGURE 234. Men and tanks of the 7th Infantry Division burning out enemy cave defenses, Okinawa, 24 April 1945.

autopsy service, although impaired by limited personnel and equipment and by failure to provide a definite plan for its direction.

Concluding Comment

The sanguinary and heroic fighting on Okinawa (fig. 234) lasted about 76 days, and the total ground casualties of the Army, Navy, and Marine Corps were staggering. The total Army and Marine Corps casualties were about 35,000 men, including 8,000 dead. According to the best figures obtainable, approximately 107,000 Japanese were killed and 7,400 taken prisoners. Of this number, according to the best statistics available, based on average battle casualties in the Pacific areas, less than 50,000 were actually killed by U.S. troops. It is apparent that the Japanese must have exterminated approximately 50,000 of their wounded comrades.

That this was common practice among the Japanese was evidenced by the very small number of Japanese wounded found anywhere on the island during mopping-up operations. No Japanese medical installations capable of handling their own expected wounded in such a campaign were ever found.

More than 5,000 prisoners of war were taken on Okinawa, and these consisted of Okinawans, Koreans, Japanese combatants, and other Japanese nationals. Of these, over 4,000 were sent to Oahu before July 1945. These

prisoners were examined at the 18th Medical General Laboratory. The results were of some medical interest.

Microfilariae, either *Wuchereria bancrofti* or *W. malayi*, were found in the blood of 16 percent of the 4,563 prisoners examined.

Three hundred sixty-five of these prisoners were examined by the rectal swab technique, and 67 (18.35 percent) were found to be harboring pathogens of the genus *Shigella*. One individual was a typhoid carrier. About 90 percent of the stools showed one or more metazoan parasites.

Hookworm was the most common helminth found; others included *Strongyloides*, *Ascaris*, and *Trichuris*. Among the protozoa found in this first group of stools were *Entamoeba histolytica*, *E. coli*, *Endolimax nana* and *Isospora hominis*.

CLINICAL ASPECTS OF THE WAR

It is not the purpose of this brief history to give details of the various diseases seen in the hospitals throughout the Central Pacific. Such descriptions and statistics will be found in other volumes of the official history of the Medical Department in World War II. It should be of some interest, however, to discuss briefly some of them, especially the exotic diseases, as they were observed in Army hospitals.

Plague in the Hawaiian Islands

Plague has been endemic in the Hawaiian Islands since December 1899. The first reported case occurred in Honolulu, Oahu, following which the disease appeared at the principal ports of Hawaii, Kauai, and Maui islands within the next 5 months. No evidence of plague in rodent or man has been reported on Oahu since 1910 nor on Kauai since 1906. It has remained endemic on the islands of Maui and Hawaii, as evidenced by human and rodent infection, which at present, so far as is known, is restricted on each island to a small focal area. An increased number of cases of plague in rodents and human beings occurred in the Hamakua District of the island of Hawaii, during the year 1943. Following this small outbreak, very strenuous rat control measures were carried out in each of the endemic plague areas, and these measures were of sufficient thoroughness to prevent any spread of plague to military personnel during the war in the Pacific.

Infectious Hepatitis

Under the terms "infectious hepatitis" or "acute catarrhal jaundice" are included those cases of jaundice of unknown causation—often epidemic in appearance but also occasionally observed following the administration of yellow fever vaccine, or following transfusion with type O blood or less often with matched blood of different groups, or following the administration of pooled plasma.

The first patients with acute infectious hepatitis following vaccination against yellow fever began to arrive on transports docking at Oahu between

10 and 16 March 1942. Numerous investigations were made, especially in the effort to differentiate the disease from Weil's disease, before it became apparent that there was a causal relation between acute hepatic disease and the preceding vaccination.

There were several hundred patients with postvaccinal hepatitis in hospitals in the Pacific Ocean Area, with one death recorded. The average incubation period following vaccination was about 100 days but varied between 30 and 120 days.

Small epidemics of infectious hepatitis followed nearly every assault by amphibious forces on the islands of the Central Pacific or South Pacific Areas. The incubation period of these epidemics was not definitely determined. As a rule, however, patients with the disease were first observed about 3 weeks after the assault. It is, therefore, apparent that the incubation period of the disease acquired during assaults on coral islands was short compared with the incubation period in cases following vaccination against yellow fever. Malaise, weakness, and anorexia were the usual symptoms, but when questioned many of the patients gave a history of fever, diarrhea, and loss of appetite about from 10 days to 2 weeks before the appearance of jaundice. These symptoms usually subsided before the onset of jaundice, and, apparently, in some patients no overt jaundice ever appeared.

A number of small epidemics of jaundice were studied with considerable care from an epidemiologic point of view without any decisive results. Neither the exact vector nor the reservoir of the disease in the Pacific area was determined with certainty. The epidemiologic evidence would seem to favor the belief that healthy carriers were responsible for the spread of the disease during periods when sanitation was at a temporarily low ebb, as immediately after an assault on an island.

During the late spring of 1945, a supply of immune serum (gamma) globulin was made available to the Central Pacific for use as a prophylactic in a threatened epidemic of acute hepatitis. This was not used, however, since troops who were hospitalized with the disease on Okinawa had been through the campaign on Leyte, where jaundice was prevalent, and it seemed probable that these troops by the time they reached Okinawa were too far along in the incubation period to warrant the use of gamma globulin as a prophylactic measure.

The incidence of acute hepatitis following transfusion of type O blood cannot be determined accurately from the data obtained in the Pacific area. The problem is difficult from a statistical standpoint owing to the presence of acute hepatitis in various stages among troops in combat, who are also the same troops among whom battle casualties requiring transfusion occur. Another difficulty is the long incubation period following the causal transfusion. In the normal chain of evacuation, the majority of individuals who would develop homologous serum jaundice would be either in a continental United States hospital or would have returned to duty in the Pacific area before symptoms became manifest. With the newer knowledge of the diphasic symptom-

atology of the disease and of the significant difference in the length of the incubation period between epidemic hepatitis and homologous serum hepatitis, it eventually became possible to collect more accurate and significant data.

Diphtheria

Diphtheria was contracted by personnel of the 27th Infantry Division on Saipan in the Marianas. A few cases appeared about the middle of August 1944. These patients were hospitalized locally. The division left Saipan the latter part of August and arrived in Espiritu Santo in the New Hebrides on 14 September 1944. While en route, a few more cases of pharyngeal diphtheria and an increasing number of skin lesions, most of which were ulcerative and located on the extremities, appeared among the personnel.

In the 27th Infantry Division, the following cases of diphtheria were reported: Pharyngeal, 77 cases; cutaneous, 95 cases; carriers, 9 cases. In the same division, it was observed that as patients with cutaneous diphtheria were isolated the number of patients with nasopharyngeal diphtheria decreased *pari passu*. In the month of November 1944, only three cases of nasopharyngeal diphtheria were reported from this division. From 25 August to 25 November 1944, pharyngeal diphtheria occurred among personnel of other organizations on Saipan, the number of cases mounting most rapidly during the first month of this period. Diphtheria in Army personnel remaining on Saipan after the departure of the 27th Infantry Division was reported as follows: Pharyngeal, 73 cases; cutaneous, 3 cases; and carriers, 6 cases up to 25 November 1944.

Cutaneous lesions giving positive cultures for diphtheria among personnel of the 27th Division were practically all ulcerative. This lesion, of the type described as tropical ulcer, was of varying diameters from about a quarter of a centimeter to several centimeters, the average diameter being 1 cm. Lesions were frequently multiple. Cutaneous ulcers were often rounded and punched out in appearance, were surrounded by a zone of dull red or bronze pigmentation, and had indurated, rolled margins. They were usually superficial. The appearance of the lesion was not uniform or characteristic enough to enable identification without the aid of laboratory study. The lesions were crusted over or covered by a serofibrinous exudate. There was usually a thin diphtheritic membrane in the base of the ulcer. There was usually no systemic reaction, and the only symptoms noted by the patient were those caused by the discomfort of the skin lesion.

The nasopharyngeal diphtheria was usually typical and easy to detect. In most cases, it was undoubtedly contracted from patients with cutaneous diphtheria. As a matter of fact, in all theaters in the Pacific area, cutaneous diphtheria occurred among the troops and especially among the natives, and it was believed that it was from patients with these lesions that the spread of diphtheria most frequently occurred in the Pacific Ocean Area. In a number of instances, evidence of peripheral neuritis with weakness and paralysis of the legs, the arms, and often of the palate and the pharynx as well as of the nasopharynx was observed in patients in whom there was no faucial diphtheria



FIGURE 235. Engineers constructing bridge across jungle stream, Leyte Island, October 1944.

and no evidence of nasal diphtheria. In such cases, it was believed that the peripheral neuritis followed the ulcerative lesions of diphtheria of the skin.

Schistosomiasis

A large number of patients were transferred to the hospitals of Central Pacific Area with a diagnosis of schistosomiasis. These men had been stationed on Leyte in the Philippine Islands and had been attached to an engineer battalion and an infantry division. They had been exposed in a fresh water stream where they were building bridges (fig. 235).

The first symptoms in most cases appeared in the middle or latter part of December 1944 and the early part of January 1945. In general, these patients became ill approximately 4 to 8 weeks after the initial exposure. Few patients noted immediate symptoms.

The period between the onset of symptoms and hospitalization varied from 1 to 30 days. This was due to the circumstance that symptoms such as weakness, indigestion, and urticaria were transitory and the patients did not seek hospitalization early. It was only the persistence of such symptoms with or without chills and fever that caused these patients to be hospitalized. Most patients, however, were hospitalized from 1 to 3 days following the onset of symptoms.

The early symptoms were varied in character. The most frequent were headache and chills and fever of the remittent type with nightly elevations. Abdominal pains and mild diarrhea were the most common gastrointestinal complaints. Skin lesions in the form of urticaria appeared early in about 50 percent of the cases; a few patients even recalled burning and tingling sensations in the skin shortly after having emerged from the water of the stream on the island of Leyte. These symptoms were probably caused by penetration of the skin by the cercariae of *S. japonicum*.

Laboratory studies revealed that the white blood count ranged from 7,500 to 18,500, the average being about 13,000 per cu. mm. There was a marked eosinophilia of the circulating blood in all patients ranging from 26 percent to 78 percent, the average being about 48 percent. The sedimentation rate was elevated in all cases. Most of these patients had stools positive for the ova of *S. japonicum* while they were observed on the island of Leyte, but only a few patients had positive stools after they had arrived in the Central Pacific Area.

Therapy consisted of intramuscular injections of Fuadin. Following this treatment, the white blood count and sedimentation rate returned to normal; the eosinophils in the blood decreased markedly, and the stools became negative. A number of patients were seen with gastrointestinal distress, enlargement of the liver, and jaundice; and a few were seen with marked evidence of involvement of the central nervous system.

Venereal Diseases

The venereal disease problem in the Hawaiian Islands and the CPA was of considerable importance, and strenuous efforts were made to eradicate these diseases by all the means developed during the past years. In general, these methods consisted of suppression of clandestine and overt prostitution by closing all houses of prostitution, by education and individual prophylaxis, by tracing of procurers and contacts, by examination of contacts, and by reporting and treating all individuals infected with venereal disease.

In 1911, the venereal disease rate per 1,000 per annum was 175.3; in 1941, 14.1; in 1942, 9.6; in 1943, 4.2; in 1944, 7.3; and in 1945 (incomplete), 7.1. These rates should be correlated with the number of Army troops on the island of Oahu at any given time. In November 1941, there were 39,000 troops; in July 1944, 162,000 troops; and in July 1945, 144,000 troops.

Many of these soldiers were trained on Oahu and moved on to be replaced by new troops. The population of Honolulu was increased by large numbers of Naval personnel, many male civilian warworkers, and relatively few female warworkers. In a short time, the number of males greatly outnumbered the females. Under such circumstances, with relatively few women in the ancient profession, it is probable that the number of exposures remained about constant but the number of exposures per thousand troops decreased and the venereal disease rate per thousand troops per year naturally decreased. Study of

contacts in the early part of 1942 showed that 75 percent of all venereal diseases in military personnel were contracted from professional prostitutes. Thus, the decrease in the venereal disease rate was a relative phenomenon, ascribable to a lower exposure index per military person, although the exposure rate per prostitute may actually have increased. The actual number of patients with venereal disease in the hospitals remained nearly constant.

Eventually, the treatment of venereal disease became the responsibility of the chief of the medical service in all military hospitals, and, with the introduction of penicillin, treatment followed the general pattern observed in all other theaters of the war.

In the Mariana Islands, syphilis was rare among military personnel, although a high percentage of the civilian population gave a positive reaction to standard tests for syphilis. Segregation satisfactorily prevented the spread of this disease to military troops. Included in the survey on the island of Saipan were 27 native female hospital patients, 36 Japanese prostitutes, and 14 members of the civilian police force of Camp Suepe. When it was found that a large number of the native adults gave a positive serologic reaction for syphilis, 42 children between the ages of 5 and 11 were examined in an attempt to ascertain whether these positive reactions were produced by yaws. Scars resembling the healed lesions of yaws were observed in five adults. All of these patients gave positive reactions for syphilis. Healed lesions, typical of yaws, were found in two of the children. Both gave positive serologic reactions for syphilis. The majority of those included in the survey were Japanese civilians. Also included were 15 Chamorroan male adults and 11 Korean adults. Of the 42 children examined, 21 were Chamorroans and 21 Japanese. All blood samples were sent to the 18th Medical General Laboratory, where they were examined by the standard Kahn precipitation test. Out of a total of 296 blood specimens, 5 were found to be unsatisfactory for examination. Of the remainder, 49.8 percent were positive; 1.3 percent, doubtful; and 48.9 percent, negative. It is therefore apparent that syphilis is very prevalent in the natives in the central Pacific islands. However, since healed yaws may be followed by positive serologic tests for syphilis, this fact must be considered in the results of surveys where yaws is endemic.

Murine Typhus in the Hawaiian Islands

Murine typhus has never been a serious problem in the Hawaiian Islands. Sporadic cases have continued to occur but never in large numbers. During the 6 years from 1937 to 1942, inclusive, the incidence of endemic typhus in the civilian and military population in the Hawaiian Islands was 37, 69, 59, 72, 81, and 78 cases, respectively. The monthly average was 5.5 cases for this period. There was a considerable increase in the number of cases during the war. Although a breakdown of data for the Hawaiian Islands only is not available, for the Central and South Pacific Areas there were 65 cases of murine typhus reported in 1943 and 35 cases reported in 1944.

Among U.S. Army personnel, at least one case of epidemic typhus was known to have occurred in Hawaii during World War II. This case was reported by the 75th Station Hospital, Schofield Barracks, in June 1943.

Japanese B Encephalitis on Okinawa³

The first case of Japanese B encephalitis was seen among the Okinawan natives on 10 July 1945, and up to 26 July 1945 about 68 patients had been observed. Of these, three were U.S. soldiers. There were probably many more cases among the natives ending in death or recovery without being referred to Military Government Hospitals. It is probable that more than 100 cases had occurred. The majority of the patients were under 12 years of age. The young were equally divided between the sexes, but the few older individuals were practically all females. Most of the patients originated in the north and east end of the island. Two were members of the same family. A large number came from Heanza Shima and Homahika Shima. These islands are reasonably isolated, and but little mingling with other Okinawans had occurred.

No evidence was obtained that gave any clue to the length of the incubation period. A soldier being treated for amebic dysentery in a military hospital developed a sore throat and within 36 hours showed evidence of encephalitis. Two Okinawans, who were sisters, developed the disease—one approximately a week after the first one affected had died. There is thus a little evidence that the incubation period is short: perhaps about a week and probably less than 9 days.

A large number of the patients were seen later in the course of the illness, and linguistic difficulties made exact determination of the early symptoms and the date of onset difficult. Most patients were not observed until after the fifth day.

It was noted that many of the young patients had a cold with sniffing and some cough on admission to the hospital; some, however, did not. The usual history was that the patient had been ill with a headache and fever for about 5 days. Many patients also gave a history of inability to speak. A number of the younger patients had convulsions and drowsiness, and many gave a history of twitching movements of one limb or of the limbs on one side. Most had constipation, but a few had diarrhea.

Most of the patients were drowsy and lethargic, and their facial appearance resembled that seen in the 1918 epidemic of von Economo's disease (fig. 236). The face was flat, ironed out, and expressionless; and the patient was asleep because he couldn't remain awake. Ocular symptoms were frequent, especially conjugate deviation of the eyes, occasionally ptosis, and often nystagmus. The pupils were dilated or small and often unequal. Facial weakness on one side or the other was frequent. Flaccid or spastic paralysis of a single limb or of hemiplegic type was frequent. Coarse jerking of a hand or a foot or coarse

³ Personal observations made between 10 July 1945 and 31 July 1945 at Okinawa by the author.



FIGURE 236. Native child with encephalitis, Okinawa, July 1945.

tremor of an extremity was often seen. Stiffness of the neck was practically always observed early in the clinical course. Trismus was very frequent, and it is of interest that the disease was first recognized in a group of patients who were thought to have tetanus. The reflexes were usually disturbed. The Babinski sign was usually positive on one or both sides. Ankle clonus was frequent. The knee jerks and ankle jerks were present, absent, or exaggerated, and thus of little diagnostic importance. Decerebrate type of rigidity was occasionally seen. One patient remained in the position of decerebrate rigidity with frequent convulsive movements of the right leg and arm. The sensorium was usually cloudy, but all except those who were moribund could be aroused. The fever was usually high, 102° to 104° F., and became lower with improvement. The neurological abnormalities were changeable from day to day. Deepening of coma and increase of pulse rate and temperature were grave signs. Leukocyte counts and urine analyses were usually not made. There was constantly a pleocytosis of the cerebrospinal fluid with a low number of granulocytes. The total white cell count was between 10 and 200 in the cerebrospinal fluid.

The duration of the disease was not accurately known but was probably from 10 to 21 days. No idea could be formed of possible sequelae at the time of these observations.

A few case histories may be of interest.

Case 1.—Male, age 7 years. Headache and fever began 14 July 1945. Patient admitted to hospital on 19 July 1945. He developed convulsions and inability to speak. His temperature was 101° F., and he was comatose. The head and eyes deviated to the right. The left arm and left leg were in partial flexion. The cerebrospinal fluid contained

two lymphocytes. Patient died on 22 July 1945. Autopsy showed many new and old petechial hemorrhages, especially numerous in the vicinity of the basal ganglia. There were small areas of apparent necrosis in the left globus pallidus.

Case 2.—Female, age 7 years. Onset of the disease was on 15 July 1945 with headache, fever, drowsiness, and twitching movements of the extremities. The patient had been unable to speak for 3 days. The neck was stiff. Temperature was 102° F. The patient was comatose and in decerebrate rigidity. The cerebrospinal fluid contained 17 cells, of which 3 were polymorphonuclears. The patient died. Autopsy showed congestion of the pial vessels. No petechiae were seen in the brain.

Case 3.—Male, age 12 years. About 1 July 1945, the movements of the arms and legs seemed awkward. The next day, the patient could not urinate but had paradoxical incontinence. On 4 July 1945, his temperature was 104° F. He complained of a headache. The neck was stiff, there was opisthotonos, and the patient was practically comatose. On 6 July 1945, his temperature was 104° F. There was marked trismus. The tendon reflexes were hyperactive. There was a positive Kernig sign with flaccid paralysis of the extremities. The cerebrospinal fluid contained 84 lymphocytes. The leukocyte count in the blood was 3,200 per cu. mm. On 10 July 1945, the patient was markedly improved.

Case 4.—Female, age 49 years. On 5 July 1945, patient had a headache and a high fever; soon she became apathetic and unable to speak. On 7 July 1945, her temperature was 105° F., and her pulse was 100. She was lethargic; her eye movements were normal; there was marked trismus and stiffness of the neck. The extremities were spastic, and the tendon reflexes were hyperactive. There were athetoid movements of the hands. The Babinski sign was positive on the right. The cerebrospinal fluid contained 20 cells, all of which were mononuclears. The white blood count was 6,400. On 11 July 1945, the patient was very markedly improved.

Case 5.—Female, age 24 years. This patient became ill on 7 July 1945 with headache, fever, and dizziness. She was dull and unresponsive. On 18 July 1945, she was semistuporous, responded slowly, and was unable to speak. There were coarse tremors of the facial muscles, especially on the right. There was pain on passive movement of the extremities. There was marked flaccid weakness of both arms with rigidity of the legs. The facies was masklike. On 13 July 1945, the cerebrospinal fluid contained 26 cells. On 20 July 1945, the patient died. At autopsy, the brain was markedly edematous with congestion of the pial vessels over the entire cortical surfaces.

Between the appearance on 10 July 1945 of the first case of the disease on the island of Okinawa and up to 26 July 1945, there were 68 cases of encephalitis of unknown causation—65 in civilians, 3 in military personnel. The mortality was about 30 percent, with no fatalities in soldiers. The onset was acute, and the incubation period was probably less than 9 days. The clinical findings pointed to widespread disseminated lesions in the cortex, subcortical areas, corpora striata, midbrain, and probably occasionally in the cord. The clinical course suggested that there should be widespread perivascular lesions without demyelination and with severe but transient injury of the motor ganglion cells of the brain.

The Military Government Hospital on Okinawa at the city of Taira was visited by Colonel Mason, on 27 July 1945. In the previous 3 days, seven patients had been admitted to this hospital. All of these were examined, and each had symptoms suggesting Japanese B encephalitis. All were between 5 and 18 years of age. One had left hemiparesis. One had athetoid movements

of the hands. One had right facial palsy. One had convergent squint. All were drowsy and had nuchal rigidity. All complained of malaise and headache. All had fever. One had 200 cells in the cerebrospinal fluid. All of these patients had the typical ironed-out, expressionless facies. All had disturbances of the tendon reflexes, and each had unilateral or bilateral positive Babinski signs. All were natives of Okinawa.

Three soldiers with headache, increased cellular content of the cerebrospinal fluid, fever, and some scattered neurological lesions were admitted to the 86th Field Hospital. All probably had cases of mild Japanese B encephalitis.

At NAMRU (Naval Medical Research Unit) No. 2 on Guam, the brains of a number of the patients from Okinawa who had died of Japanese B encephalitis were examined. They showed scattered round cell infiltration in the Virchow-Robin space. Areas of degeneration of the cortex and midbrain with innumerable small lacunae in the affected area were found. These areas were rapidly infiltrated by glia cells and by astrocytes. The Betz cells were damaged but not severely. The most marked changes were seen in the cerebellum. In addition to the lacunar type of degeneration there was complete cytolysis of many Purkinje cells. There was only a little demyelination and that only near areas of cellular degeneration in the cerebral gray matter.

A summary as of 25 August 1945 was contained in a personal letter from Maj. Wilbur G. Downs, MC, acting chief of Preventive Medicine Service, Okinawa. He stated: "There have been 18 probable instances of the disease on Okinawa among troops with 2 deaths and 6 suspected or probable examples with no deaths. All of the probable troop cases have come thus far from northern Okinawa. There have been possibly 120 examples of the disease in natives up to this date. All of the patients seen recently have originated in northern Okinawa and the focus at Nodake in the south has been quiet. The mortality rate in natives has been 25 to 30 percent. We do not know any more about subclinical infections than previously and it is still thought that many native patients who have the disease are never seen nor observed by physicians."

The virus was isolated and put through several passages in mice at the NAMRU laboratory. It was isolated from the brain and spinal fluid of one patient only but was not isolated from the blood.

The complement-fixation tests on sera from patients during the acute and convalescent phase of the disease were strongly positive for Japanese B encephalitis.

The virus isolated has been determined by means of virus neutralization studies to be identical with the Nagasaki strain of Japanese B encephalitis. This is the strain from which the vaccine was prepared.

Search for insect vectors was carried on for many weeks with negative results. Search for animal hosts and reservoirs was likewise unsuccessful.

A large number of healthy natives were bled in order to determine the amount of immune body in the blood, in the hope of throwing some light on the endemic and epidemic situation in Okinawa. This work was not completed at the end of hostilities.



FIGURE 237. Troops of the 27th Infantry Division, first to receive passive immunization for Japanese B encephalitis from formalin-fixed virus after passage through mouse-brain tissue, Okinawa, August 1947.

It is evident from descriptions in Japanese textbooks of medicine and in Japanese articles on the subject, especially those in which Japanese investigators describe isolation of the virus after passage through mice (fig. 237), that the disease as it occurs in Japan is considerably different in character from that observed in Okinawa. Apparently, the reservoir of the disease is located in Okinawa. The vector is not known. When an epidemic occurs in Okinawa each summer, the younger children are chiefly affected, probably because the older children and adults have survived mild or subclinical attacks in early childhood and have become immune, although mortality from the clinical forms of the disease in very young children is usually high. It was believed that the virus producing epidemics on the Japanese islands was carried there by individuals who had acquired the disease or had become carriers of it in the island of Okinawa and returned thence to Japan. Thus, the epidemics on the mainland of Japan arise in a population in which no one has previously developed immunity from contact with the specific virus. Old and young alike are infected, and the death rate among older individuals is much higher than among the relatively immune older people of Okinawa.

Coccidioidomycosis

Since large numbers of troops had been trained in the California-Arizona area and had been exposed to this disease and since large numbers had come through California and Arizona on the way to Oahu, it is remarkable that during the war only a very few soldiers transferred to Honolulu were on arrival found to have acquired coccidioidomycosis. No patient with generalized coccidioidomycosis was hospitalized in the Central Pacific Area.

Dengue

Descriptions of epidemics of dengue in various parts of the world have appeared in medical literature since 1780. The vectors of dengue have been reported from most of the islands in the CPA, and the disease is endemic in Makin, Tarawa (Gilbert Islands), and the Ellice Islands. An epidemic of dengue occurred in Honolulu in July 1943; in 1944, there were two outbreaks, the first starting in the Gilbert Islands and the second in the Marianas.

Epidemics of dengue in the Central Pacific

On 3 August 1943, the Board of Health of the Territory of Hawaii was informed concerning three cases in which the diagnosis of dengue was suspected and, in further observations, was confirmed. Several days later, another physician reported the same diagnosis in three other individuals who became ill on 2 July 1943. These patients resided or were employed at the Beach Walk Inn in the Waikiki district. Later, it was ascertained that three flying personnel of the Pan-American Airlines arriving on Oahu from the Southwest Pacific were ill on 4 July 1943 with what was then thought to be influenza. These three new patients also resided in the Waikiki district. A review of the case histories by board of health physicians and the attending physicians resulted in the decision that the diagnosis probably should be dengue. These cases were the first to be recognized as dengue in the city of Honolulu and were responsible for the introduction of this disease into the Hawaiian Islands. When this knowledge came to the attention of other physicians, 17 new cases were reported during the week of 28 July to 4 August 1943. All but two of these patients lived or were employed in the Waikiki district. This area, being primarily a resort frequented by transients, provided an ideal source of dissemination. By 15 September 1943, the disease was diagnosed in a total of 17 servicemen. It is of interest to note that 11 out of the first 14 cases of Navy personnel with dengue were sailors on leave and billeted at the Royal Hawaiian Hotel in Waikiki. In Honolulu, the *Aedes albopictus* represents 60 percent of the mosquitoes found, *Culex quinquefasciatus* represents 36 percent, and *A. aegypti* represents 4 percent. The overall breeding index of the city averages 10 percent. The epidemic of 1943 ended with 1,339 civilian and 56 military personnel with dengue reported after the onset of the outbreak on 30 June 1943. This epidemic was brought under control by screening of patients, curtailing interisland travel, eradicating mosquitoes and their breeding places, and declaring certain places off limits.

The second epidemic outbreak of dengue occurred during 1944. This time, the patients were among the military personnel in the CPA and were evacuated to the hospitals on Oahu. In February 1944, 396 patients with dengue were admitted to the hospitals on Oahu. The rate among troops in the CPA for the month was 26.10 per annum per 1,000 average strength. These patients came from the Gilbert Islands where the outbreak started. The main arthropod vectors proved to be *A. aegypti* and *A. albopictus*. On Makin Island where dengue is endemic, the only vector detected was *A. renegatus*.

Again in July 1944, following the Saipan campaign, another dengue outbreak occurred resulting in the admission of 774 patients to the hospitals of the CPA, chiefly on the island of Saipan in the Marianas.

The clinical symptoms among the military personnel who had contracted the disease in 1943 resembled the typical clinical features of dengue as it occurs in garrison troops. The disease was much more severe in the patients seen in 1944 following the military operations on the Marshall Islands and Saipan.

The onset was sudden with chilly sensations and headache. In the mild cases, there were several days of vague body aches and malaise. The headache was most severe in the frontal region and was usually associated with postorbital pain, which was aggravated by lateral deviation of the eyeballs. Malaise, low back pain, and joint pains were also common complaints. Break-bone pain, which is considered a cardinal symptom of dengue, was not common in the small groups of patients seen in 1943. However, those patients who were admitted from Saipan and the Marshall Islands complained of having had this pain in the bones, which in this disease is all but unendurable and can hardly be exaggerated. The pain behind the eyeballs was much more severe in this group also. A rash was seen in only a few patients.

Temperature curves varied, with elevations of from 100° to 104° F. In many of the patients seen in 1943, the temperature reached 101° F. daily and failed to show the classical saddleback or dromedary curve. Many patients, treated in the dispensary for several days, had temperatures that had begun to decline on admission and never showed a secondary rise. In the patients evacuated from the Marshall Islands and Saipan, the temperature graph in a small percentage resembled the saddleback curve.

Enlargement of the lymph nodes was a striking physical finding. It was not particularly prominent early in the disease but became more apparent during the later course and often developed very rapidly. The enlarged nodes seldom exceeded a maximum dimension of 2 cm. by 3 cm. Tenderness was noticeable on firm pressure.

When there was a rash, it appeared suddenly and involved a definite area of the body. The rash consisted of bright pink-colored macules, about 3 mm. in diameter, which faded on pressure. Maculopapules were occasionally observed, most often in the skin of the Negro patients. The eruption was discrete, the lesions did not coalesce and did not tend to form patterns. The rash was distributed evenly over the neck, thorax, upper abdomen, and arms. It

persisted unchanged for about 24 hours after defervescence, then faded rapidly.

The white blood count as a rule varied between 3,000 and 5,000 cells per cubic millimeter. Monocytes were present up to from 4 to 6 percent, and many irritation cells and immature forms of neutrophils appeared.

Control of dengue on Saipan

It is of historic interest to show what methods were employed in the eradication of vectors of dengue on the island of Saipan.

Following the assault on this island on 15 June 1944, dengue made its appearance among the troops. This was expected since it was known that dengue existed on Saipan during the Japanese occupation. The incidence was low during the first weeks, however, probably owing to the fact that the rainy season had not yet begun and that mosquitoes, although present in the vicinity of villages, were not found in large numbers. By 11 August 1944, mosquitoes were abundant, and a dengue rate of 300 had been reached among garrison troops and rapidly mounted to a rate of approximately 3,500 by 8 September 1944. The early rates are not considered entirely correct—owing to lack of trained personnel and of adequate reporting methods—and are believed to be below the actual incidence. After 13 September 1944, accurate records were available concerning the incidence of dengue covering all troops (Navy, Army, and Marine Corps) on the island. The records show that between 8 September 1944 and 6 October 1944 the dengue rate had dropped from approximately 3,500 to 182.

Mosquito control problems.—At the time of the occupation of Saipan on 15 June 1944, there was an unbelievable amount of rubble resulting from the total destruction of scattered dwellings and villages. A multitude of wells, cisterns, vats, troughs, and diverse facilities for the collection of rain water, as well as an immense quantity of such items as tins and shell cases, provided suitable locations for the breeding of certain mosquitoes.

One platoon of the 743d Medical Sanitary Company was available for sanitation and mosquito control. The program was immediately begun with the spraying of wells and cisterns with kerosene and with the removal of artificial breeding containers in Charan Kanoa and Isley Field. Wells and cisterns were stocked with small fish, which fed on mosquito larvae. A large part of the time spent by this platoon had to be expended in fly control. With the beginning of the rainy season, it was evident that the number of trained personnel available would be insufficient for adequate control of mosquitoes by these methods.

A supply of DDT was received on 3 September 1944. Plans were made immediately to introduce DDT into the effort to control mosquitoes on Saipan. No data were available on satisfactory methods of covering large areas of ground by airplane spraying. The following procedures were accordingly devised and applied. A large quantity of a 5-percent solution of DDT in kerosene was prepared, and Army and Marine Air Force units were called upon to work out the technical problems involved in spraying large areas of the island. An

M-10 tank was attached to the underportion of the fuselage of a C-47 airplane and used without detonators or glass shields as a combination surge tank and venturi tube. Seven 55-gallon oil barrels were placed on their sides in the fuselage, connected in series, and piped through a 1½-inch pipe to the M-10 tank. A control valve was placed on the line from the fuselage tanks to the M-10 wing tank, to be opened and closed by a soldier on signal from the pilot. This arrangement permitted a flight of not less than 20 minutes carrying over 300 gallons of insecticide in contrast to a flight of 25 seconds if, as had been suggested, four M-10 wing tanks were used. The equipment as described was installed in a C-47 airplane. As more was learned about the weight and balance capacity of the airplane, it was found possible to double the amount of insecticide carried into the air by standing the tanks on end in a cradle, each tank being equipped with an air vent and each series being attached to a 2-inch pipeline through which the entire series could be filled. By this system, each series of tanks could be reloaded simultaneously from both sides of the airplane and approximately 45 minutes of spraying time could be accomplished during each flight. A C-47 airplane so equipped can take off and fly approximately 800 miles without an overload.

During the first test run on 12 September 1944, made with kerosene insecticide, the airplane flew at a speed of about 140 miles per hour at an altitude of from 50 to 100 feet, covered a swath estimated at from 75 to 100 feet wide, and applied somewhat less than 1 quart of insecticide per acre. Application of DDT insecticide by airplane began on 13 September 1944. Owing to the speed of the airplane, the roughness of the terrain, and the unevenness of the shoreline of the island, it was not considered practical for the pilot to attempt to follow prearranged markers to identify swaths sprayed or to be sprayed. In determining each successive line of flight to prevent overlapping of swaths, the pilot had to depend upon his ability to recall land markers.

The southern part of the island, designated as Area I, is relatively flat and consists of about 9,200 acres. It was sprayed by first circling the outer border and gradually working inward to the center. A total of 7 missions, on 13 and 14 September 1944, were flown over this area, using 2,000 gallons of 5 percent DDT in kerosene to cover it. This application was calculated at less than 1 quart of the mixture per acre for the total acreage, indicating that swaths had been too widely separated in some places. Another application was therefore made on 17 and 20 September 1944, requiring 6 missions and 1,800 gallons of spray and covering the area with a different flight pattern. The two applications totaled about 1.65 quarts per acre for the total acreage.

The populated portion of the west side of the island from Charan Kanoa through Garapan to beyond Tanapag, designated as Area II, was sprayed on 15 September 1944 in 3 missions with 900 gallons of spray. A second coverage of this area was made on 20 and 21 September 1944 in 5 missions with 1,330 gallons of spray. This area, lying along the coast, was sprayed by strip flying at approximately from 50 to 75 yards apart. A total of about 3,000 acres was covered with 2,230 gallons of spray, averaging 2.97 quarts.

The populated portion of the east side of the island around Magicienne Bay north to Inai Fahu and including East Field, designated as Area III, was sprayed on 16 September 1944 in 4 missions with 1,370 gallons of spray. A second application was made on 22 September 1944 in 4 missions with 1,200 gallons of spray. The total acreage in this area was approximately 3,450 acres, and it was sprayed with 2,570 gallons of insecticide, an average of 2.98 quarts per acre.

The total airplane spraying during the period from 13 to 22 September 1944 covered approximately 15,650 acres with 8,600 gallons of spray for the two applications, averaging about 2.2 quarts per acre, or 1.1 quarts per application per acre. A heavier application of insecticide was sprayed upon Area II and Area III in which there was the greater density of troops and heavier mosquito breeding.

Residual spraying.—Another important approach to the control of dengue sought to reduce the number of adult mosquitoes that alternately hide and bite inside buildings and tents, some among these being vectors of the disease. This was done by using DDT as a residual spray; for example, a wetting spray of DDT solution leaving a residue of DDT crystals effective in killing mosquitoes, which might or might not be vectors of dengue.

The Chemical Warfare Service turned over one of its truck-mounted chemical-decontamination power-spray units for this work. A special spray boom, equipped with a series of four nozzles, each with a 60-gage opening in the spray disk, was built by the 283d Ordnance Company. On 14 September 1944, residual spraying with this rig began in all tents, including quarters, wards, offices, and latrines, of the 148th General Hospital. This was done in about half the hospital area 2 days prior to spraying by airplane in the same area. The procedure was very effective, and freedom from mosquitoes inside all sprayed tents was noted during the nights of 14 and 15 September 1944. After airplane spraying on 16 September 1944, there was freedom from this annoyance both outside and inside the tents.

Following the residual spraying of the 148th General Hospital, numerous other units, including the 369th Station Hospital and the 2d Marine Division Hospital, were similarly sprayed.

The 176th Station Hospital moved into their designated area on 22 September 1944. This area was within an edge of the area of the 148th General Hospital and had been sprayed by airplane on 16 September 1944. On 18 September 1944, a residual spray was applied to all tents that were to be occupied by the 176th Station Hospital within the next few days. There was not a single case of dengue in this unit during the succeeding 21 days, as contrasted with a very high incidence in the personnel of the 148th General Hospital during a similar period of time after they occupied this area on 10 August 1944, before spraying.

Surveys of mosquito breeding before and after airplane spraying.—Eleven species of mosquitoes are known to exist on the island of Saipan, and the breeding habits of some of these made control by normal methods extremely

difficult. Of these, *A. aegypti* and *A. albopictus* have long been known to be vectors of dengue. Two additional species, *A. pandani* and *A. vexans*, have been incriminated epidemiologically in the transmission of the disease in this area. All four of these species were reared from larvae collected in artificial water containers, such as rain barrels, tin cans, turned-up helmets, and cisterns, except *A. vexans*, which is found as larvae in fresh-water ground pools. The majority of *A. albopictus* larvae are found in water contained in rot holes of trees, and the larvae of *A. pandani* occur most frequently in water held by the pandanus, although they are often found in artificial water containers as well as in tree holes. The greatest density of *A. aegypti* occurred in the vicinity of towns. *A. albopictus* occurred most frequently in areas of heavy tree growth, which was also in the neighborhood of towns. *A. vexans* was found generally over the entire island but most abundantly in flatlands or poorly drained areas. *A. pandani* also occurred over much of the island, but it was most frequently found in the immediate vicinity of heavy tropical growth containing pandanus.

Maximum abundance of mosquitoes about human beings occurred within the first hour of darkness. However, *A. aegypti* most frequently attacked man during early morning or late afternoon hours, often in the deep shade of office desks and sometimes at night in houses with electric lights of low intensity. *A. albopictus* often attacked man in bright sunlight as well as during daylight periods when the sun was low. No specimens were ever collected late at night. *A. pandani* attacked man at any time when the opportunity to suck blood was present. *A. vexans* was only seen biting man at night. From 16 August to 10 September 1944, before the first application of DDT-kerosene insecticide was made, it was possible to collect as many as from 5 to 36 specimens of *A. aegypti* from one human being during a single 10-minute period late in the afternoon almost anywhere in the vicinity of towns or villages. In addition to these mosquitoes, from 2 to 16 females of *A. albopictus*, from 1 to 4 females of *A. vexans*, and sometimes as many as 3 specimens of *A. pandani* could be collected during the same period from the same individual. Late at night, as many as 26 specimens of *C. quinquefasciatus* and 16 specimens of *C. annulirostris* could be collected during one 10-minute period while biting a single individual. In addition, *A. vexans* and *A. pandani* were often taken in such night collections.

Between the dates of 5 September 1944 and 11 September 1944, just prior to airplane spraying which began on 13 September, 6 areas, 200 yards square, were chosen in various sections of the southern part of the island as being representative localities for mosquito breeding. Careful surveys were made before and after spraying. Some areas were in wartorn towns, where artificial containers were abundant, others were typical field or woodland breeding places although such containers as tin cans and shell cases were to be found almost everywhere over the island. When the surveys were begun, it was impossible to determine the exact date upon which spraying would be done. Some of the areas were, therefore, checked as long as 9 days prior to spraying. The pre-spray surveys were made following several days of relatively light rainfall, the the postspray surveys following several days of heavy rainfall, which accounted

for the increased numbers of containers holding water, including ground pools. Surveys were made by men working side by side over an allotted strip. Records were kept of the total number of containers holding water found, the total number of samples taken, the total number of larvae and pupae taken in each sample, and the type of containers sampled. The contents of a small tin can and a tree hole, for instance, were considered as one sample. In some areas between the prespraying surveys and the postspraying surveys, some policing and woods clearing were in progress. In others, more containers had been added to the debris.

The postspray surveys were made on 15 and 16 September 1944; that is, from 24 to 72 hours following the first application of the spray by airplane. A summary of all prespray surveys indicates that 99 of 372 water-holding places, which included ground pools, rot holes in trees, pandanus trees, wells, cisterns, and miscellaneous artificial containers, produced 4,194 mosquito larvae and pupae in 600 samples. The postspray surveys indicated that 80 of 815 water-holding places produced only 1,772 mosquito larvae and pupae in 1,423 samples. This was a reduction of from 7.0 larvae per prespray sample to 1.2 larvae per postspray sample.

A total of 445 biting female mosquitoes was collected in 230 minutes, divided into periods of 10 minutes each, spread over the 30-day period prior to the application of DDT. From these data, the biting rate was estimated to have been slightly less than two female mosquitoes per minute per individual. The known and suspected vectors of dengue comprised 60 percent of the total collections made during this 30-day period. Immediately following the application of DDT-kerosene insecticide by airplane, a total of 252 female mosquitoes biting man was collected during 1,260 minutes of the 20-day period. These data indicated a biting rate of 0.2 such mosquitoes per minute. Of these 252 biting mosquitoes, only 38 percent were known or suspected vectors of dengue.

For the 10 critical days following the application of the insecticide, only 57 female mosquitoes were collected. A total of 595 minutes was spent making these collections during this 10-day period. The biting rate was thus indicated to be 0.09 mosquitoes per minute. Of these, only 40 percent were known or suspected vectors of dengue. The reduction in these mosquitoes during the 10-day period was from 1.1 (prespray collections) to 0.042 (postspray collections) mosquitoes per minute. Only two specimens of *A. aegypti* were collected during the entire 20-day period following the spray applications.

The total reduction in the mosquito population in the 10-day period following the insecticide application was thus from 2.0 to 0.09 biting female mosquitoes per minute. Since dengue patients are no longer capable of passing the virus to mosquitoes after 5 days, the following data are presented to show the reduction in vectors during this critical length of time following the spray application. In 200 minutes during the 5-day postspray period, 14 specimens were collected. Of these, there were 2 female specimens of *A. aegypti*, 2 of *A. verans*, 9 of *A. albopictus*, and 1 of *C. quinquefasciatus*. Of these 14 specimens, 3 specimens of *A. albopictus* and the single specimen of *C. quinquefasciatus*

were collected in an insectory and probably were protected from the spray. But, even including these, there was only 0.07 mosquito per minute instead of 2 mosquitoes per minute, the average biting rate immediately before the spray application.

Thus, evidence was obtained of the effectiveness of this newly originated method of dengue control. Incidental testimony to the tremendous reduction in the mosquito population was eloquently voiced by troops in every area where spraying was done. Not a single comment was heard to the contrary. All opinion was of one accord.

The incidence of dengue decreased steadily from 13 September to 3 October 1944. Spraying by airplane was begun on 13 September 1944 and completed on 22 September 1944. Residual spraying continued following that time.

The effectiveness of spraying is illustrated by the incidence of dengue in the 148th General Hospital and in the 176th Station Hospital during a period of 21 days after their arrival on Saipan, the first having arrived on 10 August, the second on 21 September. Both hospitals were located in the same part of the island. The only significant difference between them was the date of arrival in relation to the date 13 September that spraying with DDT was begun. The strength of the 148th General Hospital was 536; the strength of the 176th Station Hospital was 318. Of the total personnel of the 148th General Hospital, 33 percent had dengue by the 21st day and 47 percent by the 38th day after arrival on Saipan. By the 21st day after arrival, not a case of dengue had occurred in the 176th Station Hospital, which had landed on Saipan 7 days after spraying began. It is evident that the epidemic was broken. Careful observations were made of 4,624 new troops arriving between 17 and 30 September 1944. Forty-one cases (0.88 percent) of dengue occurred, the rate for this group being approximately 232 for this period, as compared with an approximate rate of 3,560 for the command on 13 September 1944 and 182 for the entire command on 4 October 1944.

Conclusions.—A serious dengue epidemic can be effectively controlled within a short time by the use of a DDT spray.

Mass coverage of large areas with DDT could not be done satisfactorily with M-10 tanks and small airplanes as previously recommended. Cargo planes carrying a large volume of DDT solution are necessary. The method of spraying indicated may be carried out in any combat area.

Residual spraying of such places as quarters and offices is an important part of mosquito control with DDT. Airplane spraying has the advantage of covering large areas in a short time, but work on the ground is also an essential part of the whole program (fig. 238). It is believed that tentage, mosquito bars, beds, and stools should be impregnated with DDT before issue by the Quartermaster Corps to troops, especially during the assault phase of operations.

Commonly used methods of mosquito control must be continued and should not be considered unnecessary when DDT is being used.



FIGURE 238. Member of malaria control unit spraying weeds at edge of pond, Saipan, 1944.

Airplane spraying early in the assault phase of an operation could well prevent a dengue epidemic among occupying troops since nearly all adult mosquitoes can be killed by one application. The killing of adult mosquitoes is believed to be the only factor necessary to break a dengue epidemic.

Attention is invited to the fact that a dengue epidemic like that experienced on Saipan can, through its tremendous noneffective rate, seriously affect the outcome of an operation. One airplane and crew, a few ground crews, and a small amount of DDT can, within a few days, make it possible for large numbers of men to remain available for duty who would be otherwise incapacitated.

Diarrheal Diseases

This group of diseases may be divided into two subgroups; namely, the specific diarrheal diseases (the dysenteries) and the nonspecific diarrheal diseases (enteritis and colitis). They will be discussed as they were encountered in the Central Pacific. In this discussion, dysentery will be defined as a clinical entity characterized by an increase in the total number of stools per day containing pus and mucus and accompanied by abdominal pain and tenesmus. This symptom complex may be induced by several known specific agents, of which the more important are the dysentery bacillus and the *E. histolytica*.

During the occupation of Pacific atolls, under the conditions existing for the first few days of contested action, large numbers of troops may be expected to contract bacillary dysentery. The incubation period is so short that a recently landed force may have a large percentage of its men sick. The troops also developed the disease in large numbers on two atolls where there was no enemy opposition and in spite of what seemed to be a full understanding of the danger involved. The greatest number of patients with diarrheal diseases were hospitalized in 1944, following the Kwajalein, Eniwetok, Guam, Saipan, and Tinian operations. Patients from these islands were evacuated to other hospitals of the Central Pacific Area.

A large number of small epidemics and a few large epidemics of dysentery were studied with considerable care. In the first epidemic, 34 carriers of *Shigella paradysenteriae* developed among 280 admissions for bacillary dysentery, a rate of 11 percent. None of these patients had received more than 7 gm. of sulfaguanidine daily nor was the drug continued after the first negative stool report. In contrast, in the second epidemic, none of 69 proved cases of bacillary dysentery became a carrier. This improvement of the carrier rate was considered to be the result of the large daily dosage of the drug and the longer duration of treatment.

In the first epidemic, of 320 admissions for enteritis, 120 received only symptomatic care, and 21 percent of these became carriers. In contrast, only 13 carriers (6.5 percent) developed among the remaining 200 cases of enteritis, even though these patients were treated with inadequate doses of sulfaguanidine. Substantiating this evidence of the drug's effectiveness is the record of the second epidemic, in which no patients with active dysentery became carriers and only 2 contact carriers recurred.

No relation was apparent between the severity of the illness on admission, the number of days of hospitalization, and the subsequent recurrence as a carrier. A definite relation, however, existed between the total dose of sulfaguanidine and the subsequent remission into a carrier state. This is shown clearly when the results of treatment in the first epidemic are compared with the results after the larger doses used in the second epidemic.

In the control of acute symptoms, there was very little difference between symptomatic therapy and specific drug therapy. Diarrhea, abdominal distress, and tenesmus yielded as readily to sulfaguanidine as to bismuth and paregoric and in about the same number of days. Sulfaguanidine was superior to symptomatic therapy in that patients so treated tolerated a full diet sooner. In the first series of cases in which diarrhea was very severe, combined therapy was tried, but no advantage was noted when compared with the larger doses of sulfaguanidine in the second epidemic.

One finding of great interest was the discovery of a large number of carriers in units with only moderate admission rates for diarrhea. In most organizations, the number of proved carriers found equaled or exceeded the number of active cases of bacillary dysentery. The control of these epidemics depended as much on the elimination of carriers as on rigid sanitation and the

hospitalization of acute cases. The discovery and control of carriers can be accomplished only by laboratory investigations. Stool studies must be made on every man of an involved unit. To hospitalize and follow only men with acute symptoms is to overlook this reservoir of future outbreaks.

Practically all instances of dysentery among troops were proved to be caused by micro-organisms that fall in the *Sh. paradysenteriae* groups. In one outbreak, however, which consisted of 53 cases among the military police, the micro-organism producing the dysentery was identified as *Salmonella newport* in group C.

Amebic dysentery.—Before 1944, few cases of amebiasis were seen in the Central Pacific. There were only 19 reported cases during the combined years of 1942 and 1943. However, in the increasing number of patients hospitalized in the CPA from Saipan, Tinian, Leyte, and Okinawa, the number with amebiasis increased fourfold in 1944 over the combined totals of 1942 and 1943.

The cases of acute amebiasis were few in number. The diagnosis was made by finding the motile forms and cysts in the stools and by proctoscopic evidence.

The bulk of the cases were classified as chronic amebiasis or as asymptomatic carriers. Many of the patients in this group never gave a history of any diarrhea. Many were admitted with vague gastrointestinal complaints, while others listed intermittent constipation, loose stools, or abdominal pain relieved by defecation as their outstanding complaints.

Nonspecific diarrhea.—The occurrence of nonspecific diarrhea or common diarrhea of unknown cause was frequent among Army personnel.

No specific statement of the etiology of these milder diarrheas as distinct from the dysenteries is possible. Dietary indiscretions or, more frequently, the character and condition of the only food available have been blamed in some instances. However, in the latter case the actual cause of the diarrhea may be considered with more probability to have been some bacterial infective agents contained in the food. By no means has the last word been said on the subject of the etiology of these diarrheal infections of unknown causation.

Filariasis

Although the only source of filariasis found within the Central Pacific Area was the Apamama Atoll in the Gilbert Islands, the first cases seen on Oahu were in 1943, several months before the Gilbert Islands operation. A total of 199 patients were received in the Central Pacific Area from the Air Transport Command in the South Pacific Area for evacuation to the continental United States. These patients remained in the Central Pacific for only a very short period so that careful survey was impossible. Suffice it to say, the malady was mild, and its manifestations were almost subclinical. The diagnosis was based upon a history of pain in lymph nodes and along lymphatic channels, generalized or localized lymphadenopathy, occasional localized swellings, eosinophilia or positive reactions to skin tests with *Diro-*

flaria immitis antigen, together with a history of residence in an area endemic for filariasis. Microfilariae were not found in the blood.

Following the Gilbert and Marshall operations in 1944, the surgeon of one of the searchlight battalions stationed at Apamama reported that patients were seen with an undiagnosed condition. The typical clinical picture follows: The onset was sudden with chills lasting 5 minutes, recurring irregularly, followed by fever varying between 100° and 101° F., which was also irregular. Headache and muscle and joint pains were common. A few days later, there was enlargement of the axillary lymph nodes and inguinal lymph nodes bilaterally. Shortly afterward, red streaks, starting at a point 2 cm. below both elbows and extending to the axillae, were noted on the medial aspect of the arms. There was no edema of soft tissues. There was some soreness of the scrotum about the 10th day of illness.

Upon arrival of these patients at the Tripler General Hospital, the evidence of acute lymphangitis had subsided. There was slight to moderate enlargement of the nodes in the axillary and inguinal regions. They were freely movable and mildly tender on deep palpation. The left spermatic cord was found to be thickened and tender in a number of instances.

The presence of filariasis in the CPA aroused sufficient interest to send a group of investigators, consisting of internists, entomologists, laboratory officers, and technicians, for clinical and laboratory survey of the Gilbert Islands.

A report of the clinical manifestations in the natives and in Army personnel and a report of the laboratory studies will be presented briefly.

Native population.—A total of 365 natives were examined on Apamama by careful inspection and palpation of the scrotum and its contents. Sixty-four (17.4 percent) were found positive for filariasis. The signs included enlargement and hardness of one or both epididymides and/or testes. Frequently, the organs could not be differentiated since a single matted mass was present. The largest such mass found was about the size of a grapefruit. Because of lack of time and facilities, it could not be ascertained if tuberculous or gonococcal epididymitis complicated this clinical picture. However, it was felt that the genital findings were characteristic enough to warrant a diagnosis of filariasis on clinical grounds alone. This diagnosis was further substantiated by blood smears showing microfilariae in 13 (20.3 percent) of the 64 natives. Of 201 natives examined on Makin, 7 (3.5 percent) showed evidence of genital involvement. It is of interest that of 46 natives with positive smears for microfilariae, 24 were found free of clinical signs.

Army personnel.—Considerable reliance had to be placed upon the histories in suspected cases in the Army. In all cases, the histories and initial findings were corroborated by the attending medical officer. Out of 39 suspects, 27 were found to present a history and clinical findings consistent with a diagnosis of early filariasis. Those eliminated either presented vague histories and findings or else showed localized infections that could have easily accounted for the observed lymphadenitis. The earliest onset of symptoms

was 25 days after arrival on the island. This occurred in one patient only. In the others, the onset occurred from 1 to 2 months after exposure in a highly endemic area.

The following clinical types of onset were noted in these cases:

1. Pain in one or more extremities, occasionally associated with a tender localized cordlike structure under the skin.
2. Pain and often swelling in various lymph nodes, especially in the axillae.
3. Scrotal pain with an associated enlargement and tenderness of the epididymis and/or the spermatic cord and its surrounding structure.
4. Low suprapubic, cramplike pain with radiation into the groins was also an initial complaint of some patients.
5. A few had an onset with urticaria which was persistent and refractory to treatment with adrenalin. In two such instances, there was also angioneurotic edema of face, hands, and feet.

All of these patients had enlarged and often tender lymph nodes in one or more sites. An unusual feature was the frequent enlargement of epitrochlear and posterior cervical nodes. At the time of survey, these enlargements were still present and could not be explained on the basis of local skin infection or other systemic disease. Nearly all the patients had a low-grade fever, between 99.6° and 100° F., and symptoms of generalized aching and malaise. Most of the patients were ill 10 days to a month. In brief, the syndrome presented by these patients was highly suggestive of an infection of the lymphatic system with marked allergic manifestations. These are essentially the outstanding phenomena in the acute episodes of filariasis.

Laboratory findings.—On Apamama, a total of 365 natives were examined for the presence of microfilariae by the thick-smear technique and the concentration method. From this group, a total of 46 natives (13 percent) was found to have microfilariae of the species *W. bancrofti* in the peripheral blood. In a group of 100 native laborers in Tarawa, 6 were found to harbor microfilariae. At Makin, out of 201 natives, 1.5 percent had microfilariae in the circulating blood. No investigation was made periodically in the same patient during a 24-hour cycle, but microfilariae were demonstrated in different natives at all hours of the day between 0800 hours and 2200 hours. Filariæ were found in the blood of natives who had come from the following islands: Apamama, Nonouti, Tarawa, Makin, Marakei, Beru, Tabetauea, Abaiang, and Nukunau.

Thirty-nine Arnav suspects at Apamama were examined by the thick-smear method as well as by the concentration method, but in no instance could microfilariae be demonstrated.

Conclusions.—The evidence presented in this survey indicates that filariasis is endemic throughout the Gilbert Islands. The disease undoubtedly has been spreading from the Ellice Islands. The investigations of these natives suggested that their transportation to different islands for purposes of labor had been factors in the spread of the disease to nonendemic areas.

The epidemiologic study on Apamama led to the conclusion that filariasis could be and had been transmitted to Army personnel on that island. It was also apparent that knowledge of early phases of this disease needed to be revised and extended. The lack of this knowledge was due to the fact that few careful observations were ever made on large numbers of susceptibles suddenly exposed in highly endemic areas.

Of interest was the fact that this same group reported that a few adult *Aedes scutellaris pseudoscutellaris* and innumerable *C. quinquefasciatus* mosquitoes were present on the Apamama Atoll. *Culex* mosquitoes, which were raised from larvae, were allowed to feed on a native carrier of microfilariae, and after 11 days numerous infectious larvae were found by dissection. The scarcity of *Aedes* mosquitoes was thought to have resulted from several weeks of dry weather. Wild adult *Aedes* mosquitoes were caught after feeding on a native carrier of microfilariae, but these survived only 1 or 2 days in captivity. Some of them were observed by immediate dissection to have taken up microfilariae. It was the conclusion of the epidemiologic team making the study that the diagnosis of filariasis in the suspected cases was epidemiologically sound.

The Army Garrison Force, Apamama Atoll, returned to Oahu during late October 1944. The returning group numbered 200 individuals, and they were examined for evidences of filariasis. While lymphadenopathy was prevalent, both inguinal and axillary, there were no scrotal signs or lymphangitis observed, and none of the troops had suggestive symptoms. Twenty-one men with moderately enlarged axillary lymph nodes were examined for the presence of eosinophilia, microfilariae, and complement-fixing antibodies to *D. immitis* antigen in the blood. These tests were all negative.

After 13 June 1945, approximately 4,563 prisoners of war arrived on Oahu from Okinawa (p. 666). From 15 July to 18 August 1945, a survey of microfilariae in these prisoners of war was completed on the 4,563 individuals. These blood smears were taken at night between 1900 hours and 2200 hours, stained with Giemsa's stain and examined for microfilariae. A second smear was taken on 3,703 of the prisoners whose smears were negative on the first examination. Microfilariae were found in the blood of 728 individuals (16 percent) of the 4,563 examined. Six hundred and thirteen of the positive records were found on the first smear and one hundred fifteen on the second.

Both *W. bancrofti* and *W. malayi* were found, the former principally in the Japanese prisoners and the latter in Koreans.

In the foregoing pages, some account has been given of the medical aspects of the war in the Central Pacific. Available for this great enterprise were the resources of modern medicine and vast stores of materiel. Implicit throughout this discussion has been the prime importance of the third factor, the medical officer with his specialized skills confronting the special needs of the soldier-patient. It was apparent in all theaters that the excellence of medical service varied as medical officers were, or were not, properly placed. Accordingly, it seems not inappropriate to conclude with a note on a subject that was a

particular concern of the medical consultant because of its essential bearing on the quality of medical service of the Army in wartime.

MILITARY OCCUPATIONAL SPECIALTY RATINGS

The medical consultant was appointed by The Surgeon General to inform him concerning technical and professional aspects of medical services in the Army. This, it may be noted parenthetically, was not an innovation in military medicine. The German Army had professional consultants in the Franco-Prussian War, and Wilhelm His, Jr., was a medical consultant to the German Army during World War I. Also, during that war, specialists from civilian life were employed as professional consultants by the English, French, and U.S. Armies. During World War II, the U.S. Army Medical Corps was increased from about 1,200 physicians in the peacetime Army to a peak of approximately 49,000. As these civilian physicians were entering the service at a rapid rate, medical units were being formed and hospitals constructed as rapidly as possible. The first problem was, therefore, an adequate and comprehensive classification of medical officers. This was accomplished by a number of methods with varying degrees of efficiency. The individual officer first gave his own estimate of his professional qualifications; that is, whether he was a qualified specialist, a general practitioner, or possessed some proficiency not related to medical practice. He was then directed to submit certain data relative to his medical and premedical training, internships, residencies and teaching positions, membership in learned societies, and whether or not he was a diplomate of one of the specialty boards. This information together with certain other facts published in directories of the American Medical Association and the specialty boards was utilized to form a preliminary estimate of the medical officer's capabilities and of his present professional ability.

The first duty of the medical consultant was to confer with the personnel officer at the proper level and to request the assignment of individual medical officers where their medical training could be used to best advantage. Owing to the relatively small numbers of specialists in certain categories, assignments have to be made at a high echelon in order to meet the overall needs of a command. Suitable assignments are the principal factor in determining the efficiency of all medical installations. They should therefore be made only on the advice of trained medical specialists and not left to the sole judgment of personnel officers with inadequate knowledge of the technical problems involved. Reassignments should be made on the advice of the theater or command surgeon with or without lower echelon or hospital commanders' concurrence. In the latter part of the war, with the initiation and evolution of the MOS classifications, the assignment and reassignment of medical officers became more realistic.

In the future, it will be desirable to give a preliminary MOS classification to every medical officer on admission to the military service, this classification to be revised by the consultant and competent medicomilitary authority as

soon as possible after the medical officer has been assigned to a permanent post and at frequent intervals thereafter. The next logical step might well be the revision of all units established according to tables of organizations to require that certain positions be filled only by officers with certain MOS and proficiency ratings. This would tend to block promotions based on considerations that are irrelevant, and often inimical, to good medical care.

It is unlikely that the present trend toward specialization will be reversed, and it is certain that professional skill varies within every specialty and in every group of consultants. The MOS is the result of a search for a method of evaluating the capabilities of a medical officer in a special field of his profession. It is not a measure of efficiency, and, although average efficiency may well be expressed by the MOS, it should not be used as a job rating, nor should it be changed every time an officer is assigned to a different service. It is a measure of his qualifications and attainments after careful comparison with those of other specialists in the same field throughout the Nation. Authority to assign or change the MOS rating should therefore be delegated only to the surgeons of major commands. As a rule, the surgeon will obtain the necessary data from the professional consultants assigned to his headquarters.

The care of the sick and wounded is above all a problem not soluble solely in terms of numbers of men and amounts of materiel. It will be best done only if the consultant is acquainted with the professional skill of each medical officer and with the uses and efficiency of all apparatus. He should inform himself also on various auxiliary services, which have large and useful functions in the care of the sick, wounded, and convalescent soldier. He should make frequent visits to all medical installations and make written reports on each unit he visits. These reports together with the recommendations he makes to the command or theater surgeon should materially enhance the quality of medical service. If these very important duties of the medical consultant are adequately performed, each medical officer in the theater will at all times have an MOS rating that conforms with his professional ability and may be quickly revised to reflect any change in his usefulness to the military service.

The MOS classification, as it evolved during the Second World War, was very profitably used to fill a real need. In the future, when any rapid expansion of the Army may be necessary, medical officers should be assigned MOS ratings commensurate with their ability and given rank commensurate with their usefulness, as soon as they are ordered into military service.

CHAPTER VIII

India-Burma Theater of Operations

Herrman L. Blumgart, M.D., and George M. Pike, M.D.

The problems confronting the U.S. Army Medical Department in USAFIBT (U.S. Army Forces, India-Burma Theater) can be understood only in relation to the environment in which the personnel of this theater worked. The climate, the lack of modern sanitation, the wild and primitive regions of the Stilwell Road (formerly Ledo Road) country in which some units operated, and the close proximity of the native Indian population in other areas created peculiar, if not unique, medical problems. Few, if any, regions excel India and Burma in the variety and profusion of disease. One million persons die annually of malaria while a hundred million suffer clinical attacks yearly, and 250,000 die of pulmonary tuberculosis, according to the most reliable estimates available. Endemic foci of the three major plagues—smallpox, cholera, and plague—constantly smolder in India and are among its principal medical exports. Each and every one of these factors posed particular medical problems or influenced professional policies and must be appreciated in any review of medical problems in this theater.

The China-Burma-India theater was established on 15 March 1942, and U.S. troops on the Asiatic mainland were designated USAFCBI (U.S. Army Forces in China-Burma-India). Lt. Gen. (later General) Joseph W. Stilwell, USA, and Col. (later Brig. Gen.) Robert P. Williams, MC, were assigned as Commanding General and Surgeon, USAFCBI, respectively. At that time, only 3,000 U.S. military personnel, chiefly Army Air Forces, were stationed in the theater, which included, generally, China, French Indochina, Thailand, Burma, and eastern India. The theater expanded rapidly. In October 1944, it was divided into the USAFCT (U.S. Army Forces, China Theater) and USAFIBT. While, of necessity, this chapter includes observations concerning activities in the USAFCBI theater, it deals primarily with USAFIBT.

When Lt. Col. (later Col.) Herrman L. Blumgart, MC (fig. 239) arrived as Consultant in Medicine, USAFIBT, on 28 January 1945, the total bed capacity of the general, station, field, and evacuation hospitals (maps 6 and 7) in the theater was 19,772, and 512 medical officers were assigned the care of 9,819 patients. From a humble organization in 1942, the Medical Department in the theater had expanded to an organization of approximately 14,000 officers and men.¹

¹ Report, Headquarters, USAFIBT, subject: Operational Data; Medical Department Facilities, IBT, 4-Week Period Ending 26 Jan. 1945.

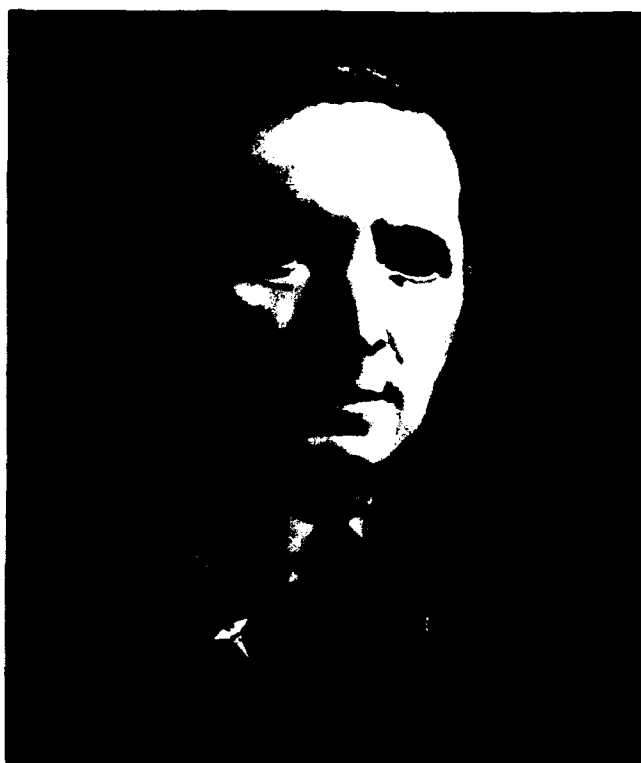
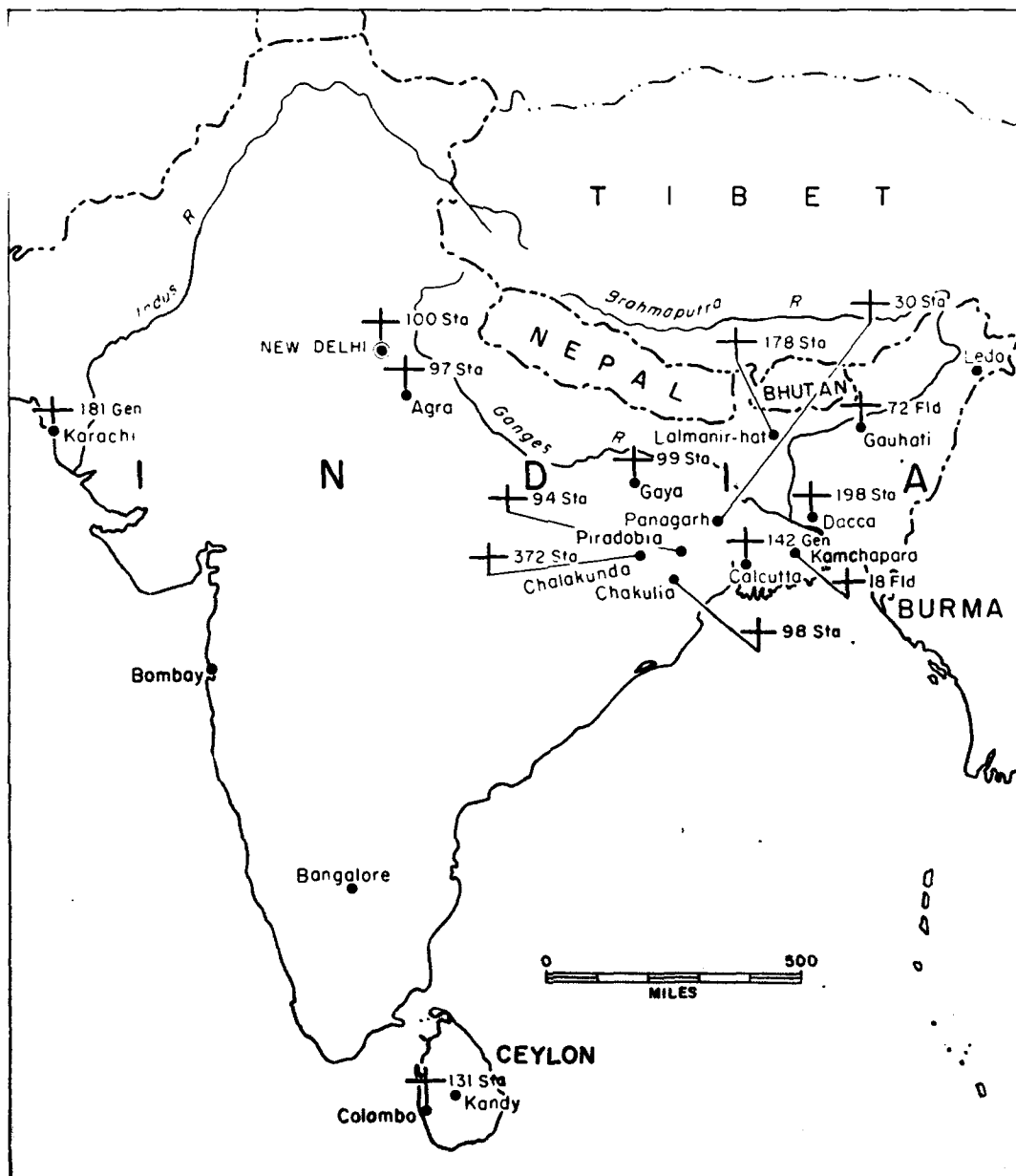


FIGURE 239.—Consultant in medicine, China, Burma, and India. Col. Herrman L. Blumgart, MC, Consultant in Medicine, Office of the Surgeon, Second Service Command; Consultant in Medicine, Office of the Surgeon, USAFIBT; and Consultant in Medicine, Office of the Surgeon, USAFCT.

SCOPE OF CONSULTANT ACTIVITIES

The primary mission of Colonel Blumgart in this already established headquarters team can be simply stated. It was to improve the quality of professional medical care by recommendations to the Surgeon, USAFIBT. Generally speaking, this mission was carried out by activities that fell into the following four groups: (1) Formulation for the Surgeon's approval of general overall policies affecting medical care, (2) formulation of specific recommendations to the Surgeon to correct defects in medical care common to various installations visited, (3) on-the-spot correction of irregularities and deficiencies observed during visits to hospitals, and (4) consultation regarding local professional problems. These four activities hardly ever existed separately, one being almost always influenced by another. In the matter of assignment of personnel, for instance, the overall distribution of medical officers necessarily conformed to the existing tables of organization and the total number of officers in various categories available in the theater. On the other hand, the individual assignment of such officers, and reassignments from one hospital to another when necessary, were frequently determined by observations, made during the med-

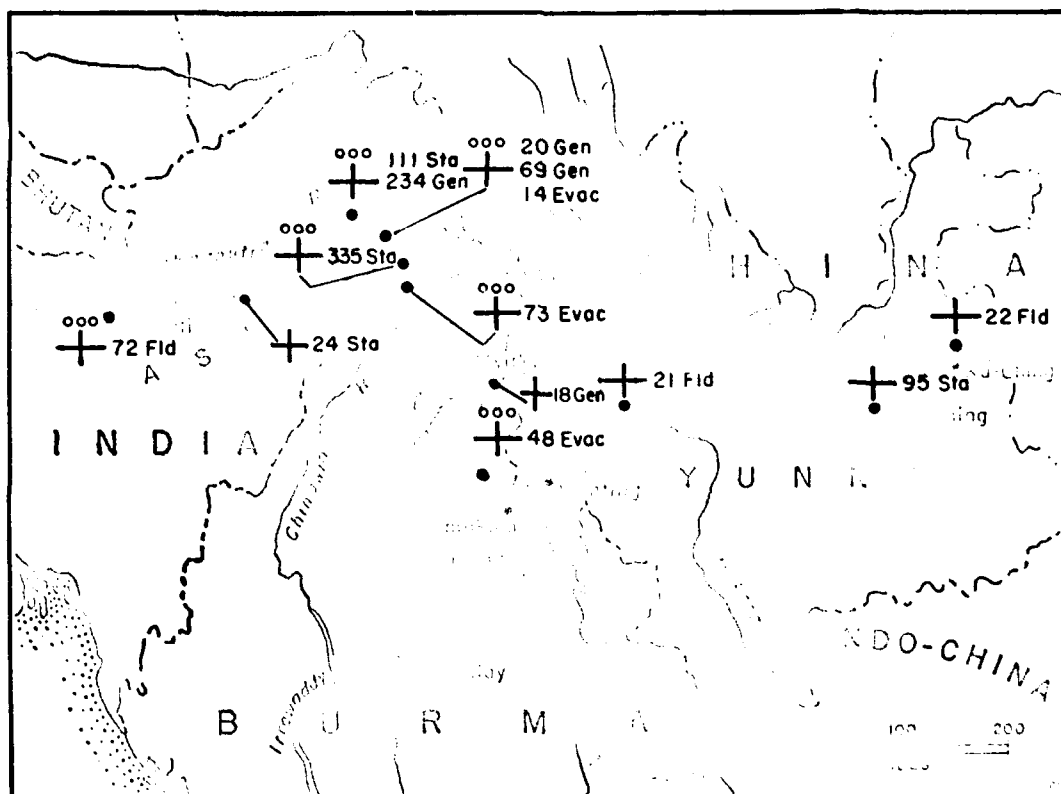


MAP 6.—U.S. Army hospitals in India.

ical consultant's visits, on the qualifications of each officer and the needs of each hospital.

Activities at Headquarters

Colonel Blumgart spent somewhat less than half of his time in the Office of the Surgeon, Headquarters, USAFIBT. Here, many activities claimed his attention as a member of the Surgeon's staff. Diseases cannot be compartmentalized; formulation of many policies and action on many problems



MAP 7.—U.S. Army hospitals in Assam, India, and northern Burma.

required coordination of the neuropsychiatric, surgical, and medical consultants' opinions. Many matters primarily the concern of the Preventive Medicine Section or of the Personnel Section in the office were referred to Colonel Blumgart for comment and coordination. The preparation of the section on medicine in the ETMD (Essential Technical Medical Data) reports; the review of all publications on medical subjects submitted to the Surgeon, USAFIBT; the preparation of material on current medical problems for the Surgeon's monthly *Field Medical Bulletin*; the preparation of theater circulars, Surgeon's circulars, and memorandums on professional medical subjects; the review of clinical records and post mortem findings in all deaths due to medical disease—these activities claimed most of Colonel Blumgart's time while at headquarters.

Coordination with neuropsychiatric consultant.—The professional problems that concerned the neuropsychiatric and the medical consultants were particularly closely related. In all medical conditions, for instance, the significance of the symptoms to the patient is important; a "stitch" in the chest if it occurs near the heart may lead to invalidism and days lost solely because of the patient's fear of heart disease or of pulmonary tuberculosis. In other conditions, such as dyspepsia with its manifold manifestations, the symptomatology may represent "body language" expressing the patient's emotional difficulties. Prolonged duty in this noncombat theater under the hardships of

the extremely variable climate of India proved to be emotionally wearing. Because medical officers themselves were not immune to these stresses and strains, they frequently were resentful of such reactions in their patients and their ability to deal with them sympathetically was reduced.

The proposal to have simultaneous visits by the neuropsychiatric and medical consultants to the various installations in the theater in order to emphasize the dual approach met with approval by the Surgeon, USAFIBT, and proved to be of inestimable value in proper treatment and salvage of many patients. The educational value of joint ward rounds, to the members of the hospital staff inculcating on them the significance of psychosomatic medicine and the importance of immediate therapy, was evidenced by the lively discussions that were almost always evoked. The major amount of each consultant's time was spent on the more specific medical and neuropsychiatric problems. At most of the installations, conferences with the staff were held jointly by the two consultants to delineate the fundamental concepts of diagnosis and therapy in psychosomatic medicine, always using as a text specific cases seen during ward rounds.

This arrangement was found to be highly effective. It worked well because the neuropsychiatric consultant was firmly grounded in the field of internal medicine and the medical consultant had some knowledge of psychiatry. To eliminate loss of time and energy on controversial points during conferences, the two consultants had achieved a common approach and general agreement. In addition, the medical consultant, interested in the more purely medical aspects of disease, actively participated in the conferences, and the neuropsychiatric consultant utilized his extensive specialized experience in answering questions at issue. All these factors helped to demonstrate to advantage the interrelationship between the two fields.

Coordination with preventive medicine officers.—Many of the preventive medicine activities in the theater were closely related to internal medicine problems. Almost daily, informal conferences were held between Colonel Blumgart and various officers in the Preventive Medicine Section, Office of the Surgeon, Headquarters, USAFIBT. The statistical accuracy of the incidence of diseases depends in the first instance on the accuracy of clinical diagnosis. In a theater in which constant watchfulness had to be exercised for diseases such as smallpox, cholera, schistosomiasis, filariasis, and kala-azar, particular caution in differential diagnosis was essential. Accordingly, Colonel Blumgart reviewed numerous case records and rendered many opinions. The initiation of Atabrine (quinacrine hydrochloride) suppressive treatment for malaria likewise raised medical problems in respect to various manifestations of Atabrine toxicity and to the incidence, treatment, and administrative disposition of the affected individuals. One of the most pressing problems in the theater was the high incidence of diarrheal and dysenteric diseases, particularly amebic dysentery. As will be shown later, an integrated approach to this entire problem was accomplished only by the closely coordinated efforts of the preventive medicine officers and the medical consultant.

Personnel management.—Basic to all other considerations in achieving a high standard of medical care was the question of personnel. U.S. Army medical officers as a group represent a cross section of the Nation's medical profession. The number of highly trained specialists was decidedly limited, as well as the number of general internists qualified to be chiefs of medical services or heads of sections. The personnel records of educational training and postgraduate medical experience are not a sure index of proficiency. For instance, certain medical officers with a wide range of medical knowledge, some of whom had been qualified by an American specialty board, lacked sound, conservative, clinical judgment; others lacked necessary qualities of leadership. Conversely, other medical officers with little postgraduate training, who nevertheless had maintained an active interest in scientific matters during years of general practice, were found fully qualified to be chiefs of medical services at 250- or 500-bed station hospitals. Appraisal of the intrinsic qualifications of the medical officers could be made only on the basis of personal observation during actual ward rounds. Colonel Blumgart spent at least one or more hours with each officer on the wards reviewing in detail physical findings, clinical records, and treatment and administrative disposition of patients. Informal discussions of related general subjects such as infectious hepatitis, dengue, chemotherapy, and the significance of various laboratory procedures formed part of such visits. This personal evaluation by Colonel Blumgart and a review of each medical officer's personal records served as the basis for the proper assignment to each officer of a classification number and rating and made possible a full utilization of each officer's capabilities. In some instances, personality clashes rendered an officer's services ineffective at a particular installation and could be obviated by his assignment elsewhere. The Surgeon, USAFIBT, emphasized the importance of a personal evaluation of each medical officer by Colonel Blumgart and directed that the personnel officer consider Colonel Blumgart's opinion before effecting transfers and assignments. This appraisal of officers by the consultant proved helpful to the personnel officer, who was confronted constantly with shifting needs consequent to the departure or arrival of medical officers.

Editorial duties.—Colonel Blumgart was responsible for the preparation of the section on medicine in the ETMD report, submitted monthly to the Surgeon General's Office. It was found that the reports submitted by the hospitals had become routine and lacked material of medical interest. The Surgeon, USAFIBT, addressed a communication to all the installations in the theater as well as to the headquarters of subordinate commands stating the type of information desired. During a visit of Colonel Blumgart to the various installations, further effort was made to stimulate studies of groups of unusual cases, such as kala-azar, atypical pneumonia, and cerebral malaria. Much valuable material was thereby accumulated. Colonel Blumgart reviewed all medical articles submitted to the Surgeon, USAFIBT, for publication.

Colonel Blumgart was also responsible for articles or comments on current medical problems in the *Field Medical Bulletin*. Medical officers were encour-

aged to submit reports on their studies, and many of these were published. The *Field Medical Bulletin* also provided a valuable means of conveying information regarding recent advances in medicine. Various irregularities or deficiencies, such as failure to comply with certain directives or misunderstandings regarding the intent or meaning of others, were corrected by appropriate brief notes. In some instances, where no suitable official guides or directives were available, appropriate circulars or memorandums were submitted to the Surgeon, USAFIBT, for approval and then distributed. A more detailed account of such directives is included later in this chapter in discussions of the various diseases of particular interest in this theater.

Review of clinical records and post mortem findings.—Soon after Colonel Blumgart's arrival in the theater, the Surgeon, USAFIBT, approved the request that complete clinical records and results of post mortem examinations for nonbattle casualties be submitted to headquarters for review. This proved to be an exceptionally valuable procedure. By this means, theater headquarters was kept informed of some of the most interesting cases, medical care of the most seriously ill was reviewed, and occasional suggestions or deficiencies were noted. These facts were made the subject of correspondence, or, more often, a conference with the hospital staff was held on Colonel Blumgart's next visit to the installation. It is believed that this procedure also had anticipatory value as it was generally understood by medical officers that the clinical record of any seriously ill patient would eventually be scrutinized in the theater Surgeon's Office.

Other activities.—In addition to the main duties just outlined, many miscellaneous activities occupied Colonel Blumgart's time while he was at headquarters. Many communications were received regarding medical practice and procedure that required reply. In addition, the available current periodicals, ETMD reports from other theaters, and other reports were constantly scanned in order to maintain professional medical standards abreast of current advances.

Activities in the Field

Colonel Blumgart's activities in the field have been indicated as ramifying from his activities and relationships at headquarters and will be described in more detail here.

During the 9 months he spent in the India-Burma and China theaters, the author spent somewhat more than half his time in traveling more than 40,000 miles in field visits to the various installations, although, as much as possible, the visits were grouped to conserve time. Many dispensaries were visited, but only a few of those of the Army Air Forces could be seen during his period of duty.

The isolation arising from the wide dispersion of units and the poor lines of communication made it the more important for Colonel Blumgart to be regarded as a two-way ambassador between the theater surgeon and the installations, interpreting theater policy locally and acquainting theater

headquarters with the problems confronting the officers in the field. For the most part, medical officers had had no opportunity to discuss professional matters with anyone other than their immediate associates and had but little information regarding experience with comparable problems at other installations. The opportunity to display their own accomplishments was an important morale factor. Colonel Blumgart himself had had little specialized training or experience in the field of tropical medicine, but the clinical experience gained during initial visits to some of the large installations together with collateral reading remedied this deficiency. At many installations, the experience and ingenuity of the medical officers provided constructive suggestions that could be transmitted to the officers at other installations. This function of Colonel Blumgart as a medium for exchange of ideas was probably one of his chief contributions. The confidence of hospital personnel in his helpful intent having been established, Colonel Blumgart's suggestions were accepted without resentment. In some installations, there was a surplus of medical talent; 2 or 3 highly able internists were serving in a 200-bed hospital. In others, no internist with extensive knowledge and sound, conservative, clinical judgment had been assigned. These instances were, however, few and were readily rectified by personnel reassignments.

Training and education.—The scarcity of medical officers sufficiently skilled and personally qualified for positions of responsibility and leadership made it imperative that hospitals be considered as training centers. Thus, pivotal personnel lost through illness or rotation could be replaced. It was found that many young medical officers who were products of the emergency accelerated program of civilian medical education had considerable innate ability but meager clinical knowledge or experience. Whenever possible, such officers were assigned to duties under the immediate supervision of mature, seasoned clinicians and, after varying periods of time, were qualified to be chiefs of small station hospitals or heads of sections at general hospitals.

The criteria for diagnosis of disease and the therapeutic regimes that were employed varied greatly from hospital to hospital and indeed from ward to ward. This was due to the fact that the medical officers—men with widely different types of training, experience, and personal views—had not received the fundamental directives and guides issued by the Surgeon General's Office. Few, if any, TB MED's (War Department technical bulletins, medical), had been received, and but few overall professional policies had been established in the theater. To raise the quality of medical care to the highest possible level, each installation was directed to prepare a list of the TB MED's it lacked, and adequate distribution was effected. It was further directed that a complete file of such bulletins as well as theater surgeon's circulars, be maintained by the commanding officer and by the chiefs of medical and surgical services. In the instance of some diseases such as amebiasis, which constituted one of the major problems in the area, a theater directive was issued, since none had been made available by the Surgeon General's Office. Every effort was made to encourage faithful adherence to all directives.

The consultant attempted to stimulate professional interest by recommending the establishment of a suitable reading and conference room in each installation, even when a tent had to be erected for that purpose. Steps were undertaken to supply each installation with its authorized allowance of books and periodicals. Through the generosity of the Josiah Macy, Jr. Foundation, New York, N.Y., reprints of outstanding articles appearing in current medical periodicals were distributed to the medical officers in this theater. By informal communication between the Surgeon, USAFIBT, and the medical director of the foundation, Dr. Frank Fremont-Smith, material particularly relevant to the medical problems in India and Burma was made available. By this means, medical officers were encouraged to keep abreast of advancing medical knowledge.

In addition, medical officers were urged to review series of cases at their own installations and to prepare reports summarizing their experiences. In some instances, these reports were used solely as the basis for a talk at one of the medical conferences; at other times, they were found suitable for publication in the *Field Medical Bulletin* or even in current leading periodicals in the United States. A schedule of at least one medical conference a week and one grand ward round for the discussion of the most interesting and perplexing cases was established at the various hospitals. The value of such an educational program in improving medical care, in heightening the professional interest of the medical officers, and consequently in raising morale was gratifyingly evident. The numerous reports received from these installations were of invaluable assistance in obtaining a comprehensive knowledge of diseases peculiar to this theater.

Visits to hospitals.—The major portion of the time spent at each hospital by Colonel Blumgart was utilized in a careful review of medical practice on each of the wards. In the smaller installations, each patient was examined, the clinical records reviewed, and the clinical management discussed. In the larger installations, with a census of approximately a thousand patients, this was manifestly impossible. On each of the wards, however, at least five cases were spot checked; all patients with a fever of 101° F. or more were reviewed; and the seriously ill were examined, as well as any additional ones requested by the medical officers.

In addition to the visits on the medical wards, an hour or more was usually spent in the laboratories. In some installations, the monthly report of the laboratory substantiated the impression on ward rounds that an excessive amount of laboratory data had been requested. This practice tended toward poor quality of laboratory work with occasionally misleading inaccuracies. In other instances, laboratory tests necessary for diagnostic purposes were omitted. General criticisms of such deficiencies were never expressed, however, until the indications and contraindications for such tests in the individual patient were pointed out at the bedside. Visits to the laboratories of the hospitals by Lt. Col. (later Col.) Howard A. Van Auken, MC, Commanding

Officer, 9th Medical Laboratory, were of great value in heightening the quality of laboratory work performed.

The inspection of the X-ray department properly fell within the province of the surgical consultant, but Colonel Blumgart always made a visit in order to coordinate the activities of this department with those of the medical service. [During World War II, the radiology service in an Army hospital was frequently under the overall jurisdiction of the chief of surgery.]

At a few installations, it was observed that there were too many consultation requests from one service to another, particularly at some of the general hospitals where, at times, such complaints as headache led to a request for neurological consultation, backache for orthopedic consultation, and precordial ache for a cardiac consultation. It was emphasized that such practice results in but little benefit to the patient when required of a specialist deluged by impossible demands on his time. Time and effort were conserved by the proper use of consultation forms. The necessity for explaining on such forms the purpose of a consultation prevented the expenditure of much fruitless effort by Colonel Blumgart. The presence of the ward officer in charge of the patient at the time of consultation was urged so that the medical consultant could confine himself to the pertinent issues and resolve any differences of opinion with the medical officer in immediate charge.

Clinical research.—The promotion of clinical investigation was considered an important function of Colonel Blumgart. A study of disease may appear at first somewhat remote from the primary mission of improving the quality of medical care, but the novel medical problems peculiar to wartime, particularly in a theater such as India-Burma, raised many issues concerning which there were no guideposts from prior experience. Clinical investigation had to be undertaken to answer such questions in order to provide the best medical care. The type of investigation that could be fostered was limited by certain definite factors but was favored by the rich clinical opportunities that were available. Any study had to be relatively simple and conform to the exigencies of time available to the medical officer from his immediate compelling clinical responsibilities. Observations had to be made by means of techniques readily at hand. The possibility of transfer of officers to another assignment made it imperative that any investigation should be undertaken by a group whenever possible. Some of the time, Colonel Blumgart acted as instigator in these research projects, while at other times he merely facilitated the progress of the study. Some investigations were initiated at the bedside when, during discussions on ward rounds, a question arose that required research to provide the answer.

It was important that fruitless energy should not be dispelled in clinical investigations. To this end, it was emphasized that no research project should be undertaken without approval of the proper authority, that a definite protocol of the proposed study should be submitted to the chief of service, and that the advice and assistance of the office of the theater surgeon should be utilized.

Assisting to establish contacts between officers at the different installations, making available technical assistance from the theater laboratories and other sources, and guiding the progress of investigations were functions that the medical consultant found interesting and gratifying.

Reports to headquarters.—At the conclusion of each field trip, Colonel Blumgart submitted a report to the theater surgeon summarizing the conditions at each installation and making recommendations for improvement. The procurement of basic statistical and personnel data was facilitated by the use of a form which was given to the commanding officer of each hospital on Colonel Blumgart's arrival and was returned completed to Colonel Blumgart within from 24 to 48 hours. The form provided space for information on the number of medical personnel, by corps, on each service in the hospital; the number of patients in the hospital's reconditioning program, the number sent to the Zone of Interior in a specified period of time, the number on the medical service and the length of hospitalization, the number acted on by the disposition board, transferred to other hospitals, and being retained in the hospital for other dispositions; the name, duties, and patient responsibility of each officer on the medical service; the number of admissions to the hospital and the medical service for a specified period, including breakdowns for admissions for diarrhea diseases, fevers of undetermined origin, and venereal diseases; and finally, the number of deaths on the medical service for a specified period, with a breakdown by date, diagnosis, and race (United States or Chinese).

CONSIDERATIONS IN DIAGNOSIS OF DISEASE

Medical practice in a tropical and subtropical theater such as India-Burma requires not only new knowledge but also a reorientation in processes of reasoning in arriving at a diagnosis and presents novel considerations in respect to treatment.

1. *Effects of climate.*—The consistently high temperatures prevailing in many parts of this theater, together with the meager recreational facilities and the isolation of many of the posts, had a profound effect on medical personnel (fig. 240). Even in the relatively brief experience of Colonel Blumgart—somewhat less than 1 year—it was striking to witness alert, energetic, enthusiastic medical officers gradually “flatten out” during the second monsoon of their stay. The same influences were apparent in many of the patients hospitalized for psychosomatic complaints, such as headache, backache, and dyspepsia.

Heat exhaustion and heat stroke were not prevalent and constituted a relatively minor problem. During the hot humid months of the monsoon season, oral afternoon temperatures as high as 100° F. in apparently healthy males and as high as 100.4° F. in females were observed in nonhospitalized personnel engaged in routine activities. The subjects had been in the area 4 months and therefore had had ample opportunity for acclimatization. Similar

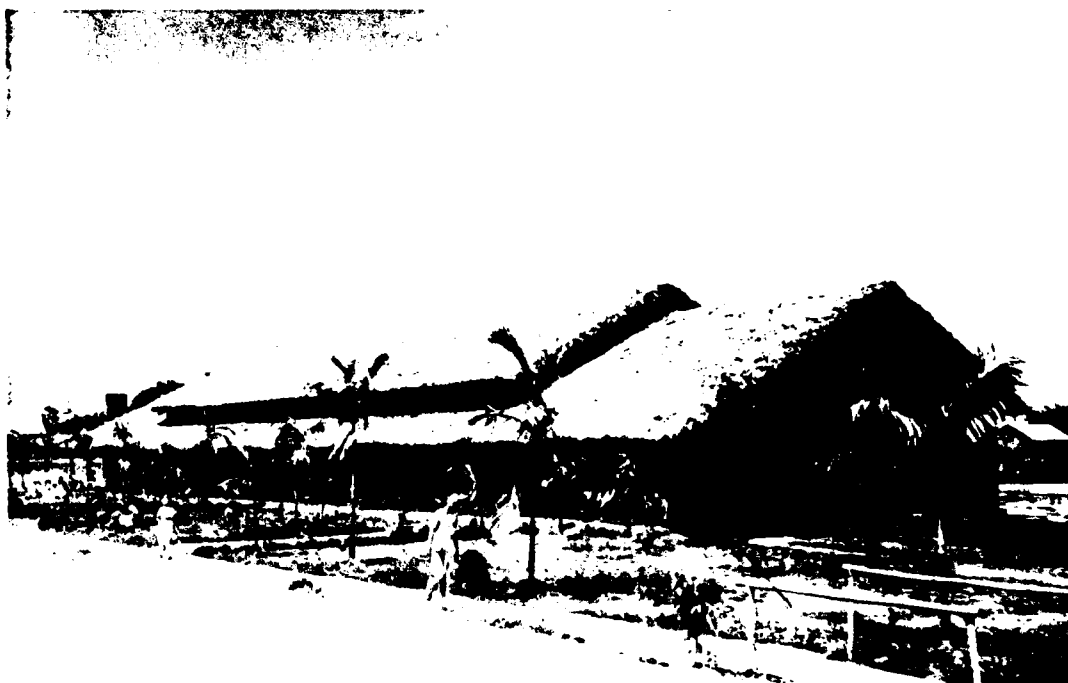


FIGURE 210. Recreation hall, 20th General Hospital.

elevations, in the absence of any explanation other than the climate, were observed in the wards of hospitals.

The widespread use of sulfonamides, particularly sulfadiazine, led to occasional renal complications during the hot season. Every effort was made to impress medical personnel with the necessity of maintaining an adequate urinary output rather than emphasizing fluid intake, and, on 2 April 1945, Circular No. 8 was published to this effect by the Office of the Surgeon, Headquarters, USAFIBT. Ingestion of even as much as 3 or 4 liters of fluid a day, even with only moderate doses of sulfonamides, under certain circumstances led to such conditions as oliguria, hematuria, and loin pain. The loss of water and electrolytes due to saline purgatives or to intercurrent vomiting and diarrhea at times assumed considerable importance.

2. *Diagnostic reasoning.* Prevalence of diseases infrequently or never seen in the United States necessitated acquisition of new knowledge by all medical officers entering this theater from the Zone of Interior. Within the theater, certain diseases were especially evident in particular areas and, consequently, epidemiologic considerations were important in arriving at a diagnosis. It was essential to know the geographic and the seasonal distribution of disease; one was required to know how, when, and where to expect to encounter various conditions. Sandfly fever was particularly likely to occur in Karachi, India, and Gaya, India, dengue in Calcutta, India, cases of hookworm along the Stilwell Road, and mite typhus in certain areas in the Ledo district. A history of having made the railroad journey from Bombay to Calcutta in the early

stages of the war was presumptive evidence of amebiasis in patients with gastrointestinal symptoms.

The prevalence of acute febrile diseases posed particularly perplexing problems in patients entering hospitals with fever. At the onset, one commonly was unable to make a diagnosis unless the blood smear was positive for malaria. A patient with malaise, fever, and symptoms similar to influenza in the United States might turn out to have anything from malaria to infectious hepatitis, scrub typhus, or kala-azar. The problem was not made easier by the great variety of clinical manifestations of dengue and sandfly fever.

In the Zone of Interior, one is usually more accurate in ascribing all of the patient's signs and symptoms to a single disease entity. In the India-Burma theater, however, a multiplicity of diagnoses was frequently indicated. A patient with any febrile illness could suddenly develop chills and fever representing the activation of subclinical malarial infection. Vague gastrointestinal complaints, not a prominent part of the clinical picture, might represent chronic amebiasis. Laboratory diagnostic procedures were an indispensable aid and placed a premium on a well-staffed laboratory department.

The challenging aspect of internal medicine in the India-Burma theater was well described in the following extract from a personal communication from Lt. Col. James E. Cottrell, MC, Chief, Medical Service, 142d General Hospital, Calcutta, India:

We are always taught, in the United States, to hunt for a single diagnosis which will explain all the features of the case. On the other hand, in this country, we must always consider the possibility that the patient has two or more diseases, and be on watch to find the others that we have not yet diagnosed. I have myself seen a man brought in from the Burma jungle with the following combination: malaria, scrub typhus, amoebiasis, bacillary dysentery, and uncinariasis. Equally impressive combinations of diseases are not uncommon in Chinese soldiers.

MILITARY IMPORTANCE OF DISEASES ENCOUNTERED

The extremely high incidence² of the diarrheal and dysenteric diseases and malaria contributed heavily to the theater's noneffective rate. Scrub typhus and cutaneous diphtheria, though less important statistically, hampered military operations because of their occurrence in combat areas and the serious disability they occasioned. Some diseases, such as infectious hepatitis, dengue, and sandfly fever, were under constant scrutiny because of their possible epidemicity, while others, such as poliomyelitis, filariasis, and kala-azar, had a deleterious effect on morale. Certain diseases with considerable incidence in the native population were never encountered in the personnel of the U.S.

² Statistical data presented in this chapter are preliminary and are subject to revision on the basis of final tabulations of individual medical records. Statistics have been derived from several sources but mainly from the statistical health reports. From the beginning of the war, through October 1944, data on U.S. Army troops in Burma-India were included in the consolidated reports for the China-Burma-India Theater of Operations. The inclusion in the data of the experience of the troops in China during the early period does not significantly affect the validity of the analysis made in terms of Burma and India because before November 1944 the Army strength in Burma and India represented nine-tenths of the total strength in the China-Burma-India theater.



FIGURE 241. Col. Isidor S. Raydin, MC, center, CO, inspecting vegetables grown under sanitary conditions at 20th General Hospital.

Army forces in the theater but constituted a serious potential threat. Thus, not a single authentic case of cholera, yellow fever, plague, or the more unusual parasitic infections was reported; medical personnel were, however, constantly alerted to their possible appearance. In regions where morbidity and mortality from smallpox and typhoid fever were extremely high, the incidence in U.S. Army troops was extremely low.

Diarrheal and Dysenteric Diseases

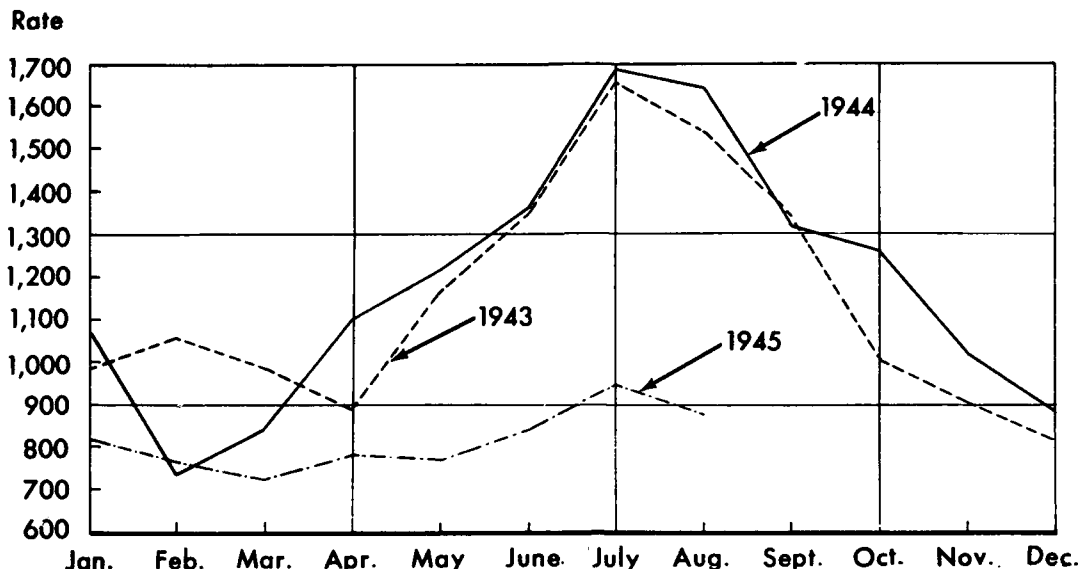
Epidemiologic factors

The prevalence of the diarrheal and dysenteric diseases among the indigenous Indian population made serious infection inevitable among military personnel unless they were properly insulated by appropriate public health measures (fig. 241). The incidence of diarrheal and dysenteric diseases in India is largely due to some of the following factors: The water supply is frequently polluted; the habits of the native population are grossly insanitary; night soil is frequently used as fertilizer; contamination of food by flies and other insects is likely to occur; the high temperatures prevailing during most of the year favor food spoilage because refrigeration facilities are meager; and, even in installations where ice is manufactured, the ice itself is frequently polluted by fecal discharges. The long supply line to the troops in this theater

CHART 5.—*Monthly admission rates, all causes, U.S. Army troops in India-Burma theater, January 1943–August 1945*¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

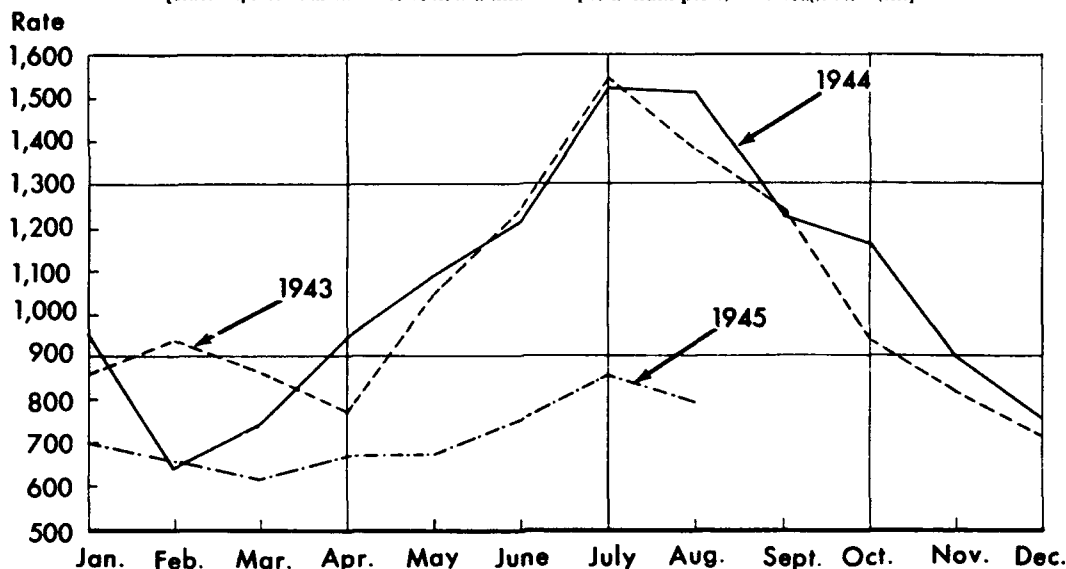
and the necessary reliance on canned articles led to a monotonous diet and increased tendency of soldiers to frequent civilian establishments. Although the low-caste Indians employed in Army messes often lived in fairly favorable sanitary surroundings adjacent to the military area, most of their insanitary habits were unaffected by contact with U.S. Army personnel. The Indians had spent their lives in an environment in which defecation was promiscuous, usually taking place near bodies of water and wells. The use of toilet paper is objectionable to them, for they consider it an insanitary method of cleansing. They perform anal ablution after defecation, washing themselves with the left hand and then rinsing the hand with any available water. Soap is rarely used, not only because it is frequently out of their economic reach but also because it is often made from animal fat, with which they avoid all contact for religious reasons. Even those that can afford knives, spoons, and forks do not use them, preferring to eat with their fingers. The entire family eats from one or two central dishes, all using their hands in place of tableware. The low-caste Indian regards the presence of flies as inevitable as the monsoon rains; swarms frequently can be seen resting on prepared food, which may be only a short fly hop from excrement on ground near their dwellings.

The urgent military necessity of sending military personnel into this part of the world did not permit the inauguration of adequate preventive measures from the outset, and it was almost inevitable that diarrheal diseases would constitute one of the most serious medical problems (charts 5, 6, 7, 8, and 9). The noneffective rate caused by the diarrheal diseases in 1944 was very similar

CHART 6.—Monthly admission rates, all disease, U.S. Army troops in India-Burma theater
January 1943–August 1945¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

to that caused by malaria (chart 9). Many patients with gastrointestinal disorders undoubtedly continued to serve on active duty, and consequently the actual incidence was probably even greater than the statistics would indicate.

Types encountered

AMEBIASIS

Of the diarrheal and dysenteric diseases, amebiasis presented the most serious problem (chart 8). It was so regarded not only because of its high incidence but also because of its insidious character, the necessity for early diagnosis and thorough treatment to prevent infection from spreading, the difficulties of laboratory diagnosis, and the seriousness of the late complications.

The solution to this problem was along two distinct lines: Prophylaxis and early vigorous action in identifying and treating already infected individuals. The protection of military personnel from infection with *Endamoeba histolytica* was the responsibility of the preventive medicine section of the theater surgeon's office. The measures undertaken are described elsewhere. In brief, these consisted of providing a clean supply of water (fig. 242), fly control, elimination of native food handlers from Army messes as far as practicable, periodic examination of all food handlers at suitable intervals, inspection of civilian eating establishments and placing unsatisfactory ones out of bounds, surveys of various units to detect carriers, and the supervision of laboratory



FIGURE 212. Water purification plant at 18th General Hospital constructed by hospital personnel.

teams engaged in special studies of the pathogens responsible for the diarrheal diseases.

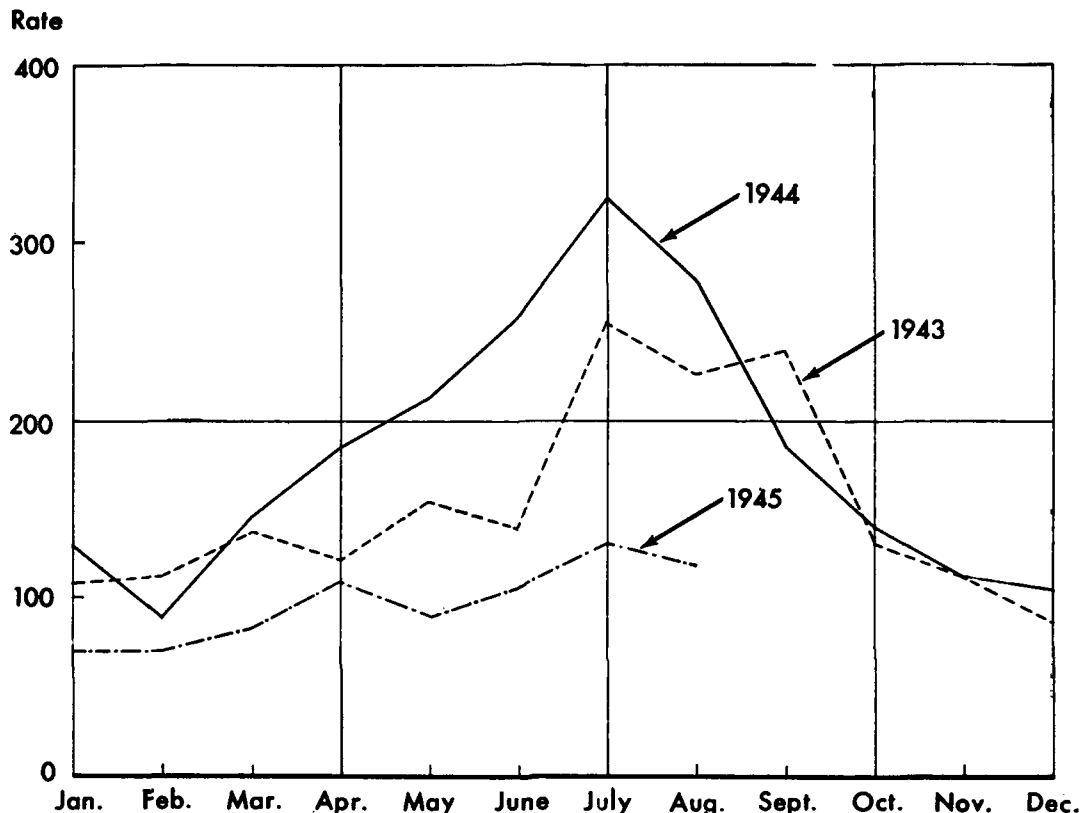
The importance of some of these factors was illustrated by the experience of various medical units in which the incidence of amebic infection soon after arrival in this theater was alarmingly high. For instance, in observations on 833 cases of amebiasis by Maj. (later Lt. Col.) Max Ellenberg, MC, and his associates at the 24th Station Hospital at Jorhat, India, it was found that approximately 45 percent of the military personnel of the hospital suffered from amebiasis soon after the installation began operations. To curb this high rate, all drinking water was boiled, fresh vegetables were scrupulously prepared under constant supervision, and natives were not allowed to enter the kitchens nor permitted to handle any utensils after sterilization. The entire personnel of the installation was surveyed, and all infected persons were treated. Instructions in regard to preventive measures were issued and enforced. The incidence of amebiasis showed a striking decrease, and finally not a single case occurred in the personnel of this installation in a period of more than 6 months.

Treatment was the province of the medical consultant. At the time Colonel Blumgart was assigned to USAFIBT, the available evidence indicated that more than 25 percent of diarrhea in the region was due to amebic infection. Visits to the hospitals revealed that its manifold clinical manifestations were not appreciated. Brief episodes of watery stools were being diagnosed as

CHART 7.—Monthly incidence rates, diarrhea and dysentery, U.S. Army troops in India-Burma theater, January 1943–August 1945¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions plus secondary diagnosis cases per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

simple diarrhea, cases of chronic hepatitis were being diagnosed as psychoneurosis, and the stools of such patients usually were not being examined. It was not recognized that "Delhi Belly" and food poisoning were frequently amebic dysentery. The importance of securing proper stool specimens, the technique to be employed in detecting *E. histolytica* in the stools, and the distinguishing characteristic of *E. histolytica* from *E. coli* and other nonpathogenic endamoeba were not always clearly understood. The therapeutic regime employed in treating the patients varied not only from hospital to hospital but from ward to ward, according to the medical officer in charge. Appropriate tests of cure were frequently neglected at the conclusion of treatment, and the followup of patients was woefully inadequate. The medical condition of many patients was not evaluated after a single course of treatment had been completed. Some patients entered other installations because of recurrence or reinfection, and records of previous hospitalization were not available.

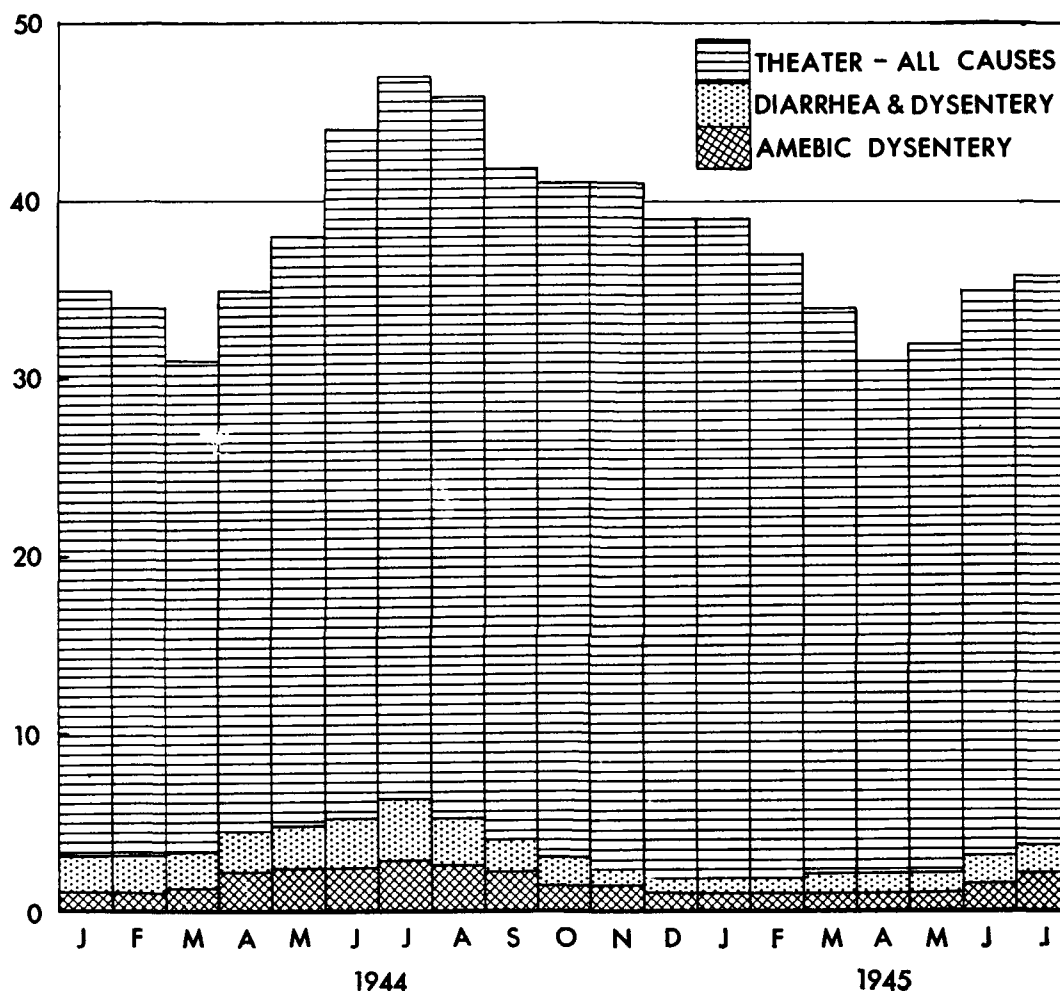
The professional medical attack on these problems was along the following three main approaches: (1) Increased accuracy in the detection of cases of

CHART 8.—Noneffectiveness from all causes, from all diarrhea and dysentery, and from amebic dysentery among U.S. Army troops in the India-Burma theater, January 1944–July 1945 ¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as average daily noneffectiveness per 1,000 average strength]

Rate



¹ Includes cases admitted in China prior to November 1944.

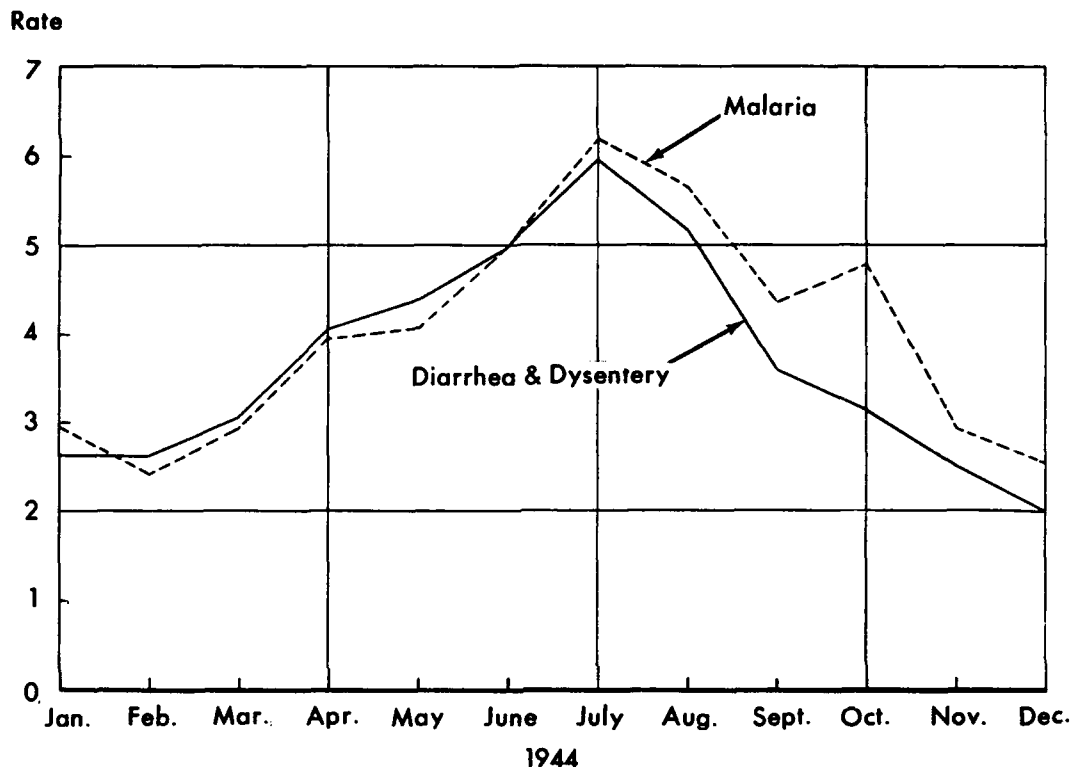
clinical amebiasis and the identification of all carriers who entered the hospital because of other diseases, (2) improved treatment in order to eliminate the disease in the individual patient and prevent his becoming a carrier, and (3) followup observation of all patients in order to be certain that repeated tests of cure would be made and therapy instituted in the event of recurrence. By encouraging reports of the results of the various measures undertaken, improved methods of practice were hoped for.

The initial step in this program was the preparation of Circular No. 9, which was issued on 2 April 1945 by the Office of the Surgeon, Headquarters,

CHART 9.—Noneffectiveness for diarrhea and dysentery and for malaria among U.S. Army troops in the India-Burma theater, by month, 1944¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as average daily noneffectiveness per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

USAFIBT. This directive outlined the salient clinical diagnostic criteria for the various forms of amebic infection. The pathology of amebiasis and the technique of stool examinations were briefly reviewed. A section on preventive measures was included. The various complications and sequelae of amebic dysentery were delineated. To achieve greater effectiveness and uniformity in treatment, a conservative basic scheme of therapy was recommended for amebiasis in each of its various manifestations including complications and sequelae. This circular was the foundation of the entire program. The following paragraphs elaborate on each of the three phases of the clinical problem.

Diagnosis of the disease group.—The first main approach to the problem was by increased accuracy in the detection of cases of clinical amebiasis and of all carriers who entered the hospital because of other diseases. The onset of amebic dysentery is frequently insidious and may be characterized by only vague symptomatology with but slight constitutional reaction. Consequently, the disease was often not diagnosed. It was essential, therefore,



FIGURE 243.—20th General Hospital

to increase the index of suspicion of all medical officers. The prevalence of diarrhea in military personnel, even in the absence of amebic infection, only added to the difficulty of diagnosis. For example, Capt. Albert Ehrlich, SnC, in a study at the 20th General Hospital, Assam, India (fig. 243), of the carrier rate in 506 apparently healthy United States soldiers who had spent 23 months in India, found that of 47 *E. histolytica* carriers only 11 (23 percent) gave a past history of diarrhea. In the 459 found free from infection, 12.6 percent gave a past history of diarrhea. This experience was similar to that observed elsewhere in the theater.

Major Ellenberg and his associates in their study likewise observed that of 486 patients who entered the hospital for complaints directly or indirectly related to amebic infection, diarrhea was by no means a uniformly characteristic diagnostic symptom. Abdominal pains were by far the most frequent complaint (70 percent); actual diarrhea was only half as common. Moreover, the patients with diarrhea rarely had marked frequency of bowel movements. The high incidence of nausea and vomiting (29 percent) and anorexia (26 percent) often led to an erroneous diagnosis of gastritis or of peptic ulcer, as shown in a study on pneumoperitoneum in the diagnosis of deformities of the liver by Clark, Bercovitz, and Jones at the 69th General Hospital, 5 miles northeast of Ledo, Assam, India. In their opinion, examination of the abdomen elicited characteristic physical signs, leading to a high percentage of correct clinical diagnoses prior to the receipt of the laboratory report. In

this study, abdominal examination typically revealed a tender, squashy cecum; a less tender, palpable, ropy sigmoid; right upper quadrant tenderness; and shock tenderness over the hepatic area.

Prominence of some of these symptoms and signs was not uncommonly due to amebic colitis simulating acute appendicitis. The combination of abdominal pain, vomiting, and tenderness of the right lower quadrant frequently resulted in the admission of such patients to the surgical service. The surgeon alert to amebiasis was not readily deceived, for a history of diarrhea, abdominal tenderness over other portions of the large bowel as well, and indurated, tender segments of the large intestine indicated the advisability of stool examinations, proctoscopy, and other diagnostic tests. The presence of amebic colitis was, however, no guaranty that the patient did not also have acute appendicitis and require surgical intervention. The general clinical impression was, indeed, that amebic colitis predisposed the patient to acute appendicitis. It was therefore advised that, when any patients showed convincing signs of acute appendicitis, delay in surgical intervention was not to be countenanced. When, however, the evidence was equivocal, symptoms and signs vague, and continued observation considered safe, a short course of antiamebic therapy often resolved the dilemma.

In the general experience of most observers, physical examination was entirely negative in from one-third to one-half of the patients hospitalized for amebiasis. When physical signs were present, they were frequently not striking and were confined to the abdomen. Increased reliance on stool examinations was, therefore, necessary.

To insure accurate laboratory diagnosis, it was essential to have well-trained personnel and to maintain close liaison between the medical ward officers and the laboratory. Few well-trained laboratory technicians were available, and as a consequence there were missed diagnoses or, equally deplorable, falsely positive diagnoses. This situation was corrected in time by visits of Colonel Van Auken of the 9th Medical Laboratory to the laboratories of the hospitals in this theater. Laboratory technicians were sent to the 9th Medical Laboratory for a refresher course of several weeks. Steps were taken to supply dispensaries with microscopes and necessary equipment to perform suitable stool examinations.

In the larger station and general hospitals dysentery wards were organized, if this had not already been done. A part of the ward was partitioned off and equipped for laboratory studies of stool specimens and sigmoidoscopy. This arrangement favored prompt delivery of specimens; increased the interest and proficiency of the medical officers in the management of the various dysenteric diseases; familiarized the fixed ward personnel with routine techniques, which were consequently carried out with greater dispatch and efficiency; and facilitated employment of the necessary precautions against infection (fig. 244). Such an arrangement had been in operation at the 20th General Hospital and was fully described by 1st Lt. (later Capt.) Arthur

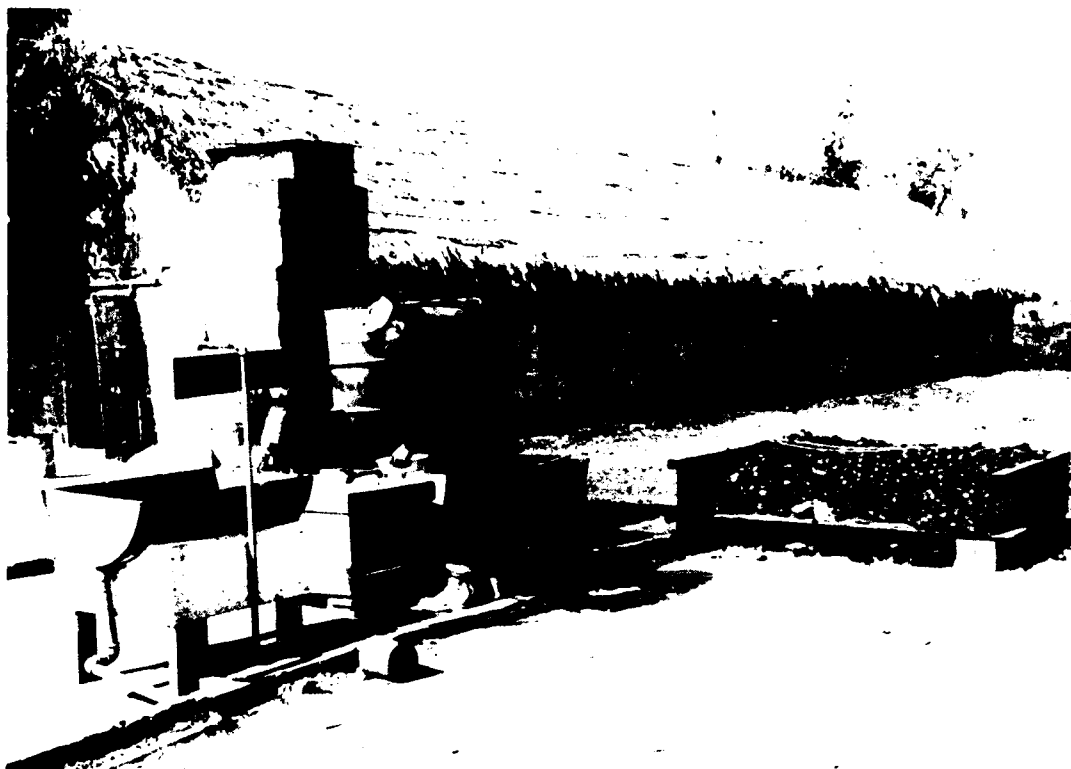


FIGURE 244.—Outdoor fireplaces provided at 69th General Hospital, in vicinity of wards, to provide hot water for hygienic and sanitary purposes.

M. Rogers, MC, and Capt. (later Lt. Col.) Kendall A. Elsom, MC, in a report on amebiasis as seen in a general hospital in Assam (fig. 245).

Certain details essential for accurate diagnosis, although generally known, required special emphasis. Particularly stressed were the importance of repeated examinations of fresh stools after saline purgatives if the patient was passing formed stools, the value of zinc flotation-concentration method, the importance of selecting proper portions of the stool containing flecks of bloody mucus for examination, and the invaluable information gained by proctoscopy. Proctoscopy was not recommended unless adequately skilled medical officers were available. Whenever practicable, however, examination of material taken directly from the lesions with a 1-cc. pipette with a small aspirator attached often led to more rapid diagnosis and at times revealed amebas despite repeatedly negative stool examinations.

Laboratory examinations of the blood generally revealed normal findings, except in cases of hepatitis and liver abscess when the white count usually was elevated.

The diagnosis of amebic hepatitis or liver abscess was frequently missed by newcomers to this theater. Patients with these conditions at times were hospitalized with vague symptoms and a diagnosis of psychoneurosis. In other instances, amebic hepatitis with or without abscess presented an acute,



FIGURE 245. Medical ward, 20th General Hospital.

severe, clinical syndrome characterized by intense pain in the right lower chest or right upper quadrant, frequently intensified by breathing and occasionally referred to the right shoulder. Chills and fever were common. Physical examination usually revealed a tender enlarged liver with rectus muscle spasm, compression or percussion tenderness, leukocytosis of from 14,000 to 24,000, and limitation of motion of the diaphragm revealed by X-ray. Physical signs of pneumonitis were not uncommon. A prior history of dysentery was frequently unobtainable, and stool examinations were often negative for *E. histolytica*. Some patients complained solely of epigastric pain and other symptoms not usually associated with hepatic pathology. Simulation of peptic ulcer, gall bladder disease, bronchopneumonia, or pleurisy was not rare.

During his visits to the various installations, Colonel Blumgart emphasized that a presumptive diagnosis of acute amebic hepatitis may be made on the basis of any three of the four following features: (1) History of diarrhea, (2) pain and tenderness over the liver, (3) fever, or (4) leukocytosis. He also emphasized that, of these four features, the second is the most constant and occasionally may be represented only by referred pain to the shoulder. The diagnostic importance of pain and tenderness over the liver made it essential that percussion or compression tenderness be sought generally in every patient as part of the physical examination.

Many of these considerations were discussed by Maj. (later Lt. Col.) G. Klatzkin, MC, in a review of his experience with classification, diagnosis,

and treatment of amebiasis. In analyzing 62 of his cases, he found they fell into four distinct groups, which were readily differentiated clinically, as follows: Acute amebic liver abscess, acute amebic hepatitis, subacute amebic hepatitis, and chronic amebic hepatitis. Major Klatskin stated:

The acute abscess cases were characterized by liver pain, high fever and frequently by cough. A definite mass was demonstrable in the liver either by palpation or by X-ray examination in every instance. The right lobe of the liver was generally enlarged and exhibited compression tenderness. Abnormal pulmonary findings were frequent. Marked leukocytosis with only slight increase in the percentage of polymorphonuclears was the rule.

The acute hepatitis cases resembled the abscess cases except that no mass could be demonstrated in the liver, liver pain and cough were less common, diarrhea and cramps were more common and leukocytosis was less marked.

The subacute hepatitis cases differed markedly from the others. Only half of them complained of liver pain. Many were admitted because of diarrhea and cramps and were found to have enlarged tender livers. Fever was inconstant and when present was low grade in character and intermittent. Cough and abnormal pulmonary findings were unusual. Leukocytosis occurred infrequently and when present was usually mild.

In contrast to the first three groups of cases, in which symptoms were usually present for less than ten days, the chronic hepatitis cases were admitted with liver pain of long duration, ranging from two to twelve months. As in the case of subacute hepatitis, fever and leukocytosis were inconsistent. Diarrhea was fairly common and cough and abnormal pulmonary findings occurred occasionally. * * * It must be remembered that cases in one group may advance or regress to another, either as a result of treatment or spontaneously under the influence of factors already discussed.

In this series of cases, the most characteristic symptom common to all groups was liver pain. This pain had a number of distinct features. It was usually localized in the right upper quadrant of the abdomen beneath the costal margin and less commonly in the left upper quadrant, in the epigastrium, and in the right lower chest. It was usually described as a constant ache or an intermittent sharp pain and, as a rule, was only moderate in severity. Major Klatskin noted:

Aggravation of the pain by movements and change in position was a prominent feature and was of great diagnostic significance. The principal aggravating factors were deep breathing and cough, bending and twisting, lying on either or both sides in bed and jarring. Frequently the patient spontaneously offered the information that these produced or aggravated his pain, but in many instances it was necessary to inquire specifically about their effect. The effect of jarring, especially on riding over rough terrain, probably occurred more frequently than indicated, as many of our patients were not asked about it.

Radiation of the pain was very common, especially on movement or change in position. In several instances, the first complaint was pain at the site of radiation, and only later was pain noted in the liver. This led to a number of diagnostic errors, especially when radiation was to the chest. The common sites of radiation were the shoulder, chest and lumbar region. On one occasion, it radiated to the neck. Radiation was always to the right, except in the three patients with involvement of the left lobe of the liver in whom radiation occurred to the left.

The compression test proved to be of great help in differential diagnosis. It clearly demonstrated the hepatic origin of the pain and differentiated it from that arising in other structures above and below the diaphragm. The test was tried in a great variety of conditions including pneumonia, pleurisy, renal colic, pyelitis, acute dysentery, peptic ulcer and malaria with enlargement of the liver and was invariably negative. It was also of some value

in differentiating amoebic from infectious hepatitis. In a large series of infectious hepatitis cases, in which the test was tried, it was negative in all but a few. The only other condition in which the test was invariably positive was acute cholecystitis. No doubt there are other conditions, such as subphrenic abscess, in which the test may be positive.

Compression tenderness is by no means to be considered pathognomonic of hepatic amoebiasis, but it has proved its worth as a confirmatory finding, and in a few instances it has made an early diagnosis possible in the absence of other findings.

Therapy.—The second main approach in clinical attack was by improved treatment in order to eliminate the disease in the individual patients and prevent their becoming carriers. The importance of early adequate treatment of amoebic dysentery, well recognized by those familiar with the disease, was not fully appreciated by most U.S. Army medical officers. In the absence of prior directives, the therapy of the various clinical manifestations was variable and characterized at times by practically sole reliance on carbarsone or one of the iodine compounds. The treatment outlined in the theater directive on amebiasis (Circular No. 9, April 1945) was similar to that advocated in paragraph 7 of Circular Letter No. 33, 2 February 1943, Office of the Surgeon General, United States Army, entitled "Treatment and Control of Certain Tropical Diseases." This therapeutic regime will be evaluated when the results of treatment as recorded in the amebiasis registers are finally available and analyzed.

It is of interest that a similar regime was employed independently by Major Ellenberg and his associates and by Captain Rogers and Colonel Elsom with apparent success. In their study of 833 cases, Major Ellenberg employed three types of treatment, all of which were similar in that emetine and carbarsone were administered during the first 10 days, one of the oxyquinoline derivatives such as chiniofon, Vioform (iodochlorohydroxyquinoline), or Diodoquin (diiodohydroxyquinoline) from the 11th to the 19th day, with either carbarsone or chiniofon enemas on alternate days during this latter period. The average time of disappearance of signs and symptoms was 8 days. The investigators described a not infrequent reaction to treatment on or about the 4th day, which closely simulated the original symptoms and usually consisted of cramps, diarrhea, a moderate rise in temperature, and general malaise. They stated: "* * * one must consider the possibility of this representing a 'Herxheimer' type of therapeutic response and not necessarily a toxic reaction * * *." At the conclusion of treatment, a proctosigmoidoscopic examination was performed in every case and was followed by stool examinations after a saline purge. Of the 833 cases, the stools were found to be negative in all but 10; these responded to a second course of treatment. The results did not indicate the relative superiority of any of the three oxyquinoline drugs used. There were 9 recurrences in the series of 833 cases. Of the 9, 3 recurred within 3 months following completion of therapy. The other six recurred from 3 to 6 months after completion of treatment and may have been reinfections. Thus, there was an overall cure rate of 99 percent. These successful results may be attributed in part to early diagnosis and treatment of the cases; approximately 75 percent had had symptoms for less than 1 month and only 7 percent longer than 3 months.

Toxic effects from the drugs in the dosages recommended were infrequent and never serious. Subcutaneous instead of intramuscular administration of emetine was less painful and had no ill effects. In a few patients, two injections of $\frac{1}{2}$ grain daily, instead of the customary single injection of 1 grain, obviated the attendant nausea.

Major Klatskin analyzed the effectiveness of treatment in 69 cases of amebic abscess and hepatitis. He employed the following criteria for cure: (1) Complete absence of pain and fever, (2) absence of liver enlargement, (3) absence of subcostal and compression tenderness, (4) normal white blood cell count and sedimentation rate, and (5) absence of *E. histolytica* from the stools. The treatment consisted of repeated courses of emetine until the criteria of cure were observed. Thereafter, emetine was supplemented with one or more courses of Diodoquin or chiniofon, followed by carbarsone, to eradicate the associated colonic amebiasis presumed to exist in all cases. The schedule of treatment consisted of a first course of 12 grains of emetine given over a 15-day period; then a course of 1 grain daily, given with a 3-day rest period after the 6th or 9th dose, depending on the patient's reaction to the drug. Most patients tolerated 9 grains, but occasionally patients complained of weakness and exhibited a fall in blood pressure after 6 grains. After a 3-day rest period, Major Klatskin found they were able to complete the 12-grain course with no ill effects. He wrote:

The first course is followed by a two-week rest period, at the end of which emetine therapy is resumed. Courses of six grains each are then alternated with two-week rest periods until the criteria of cure are met. A rest period of two weeks was chosen because it proved to be sufficiently long to prevent the cumulative toxic effects of the drug. Also it was noted that considerable improvement often occurred up to two weeks after the drug was stopped, so that the total dosage of emetine could be kept down to a minimum. Where the rest periods were prolonged beyond two weeks in the face of liver tenderness, leukocytosis or an increased sedimentation rate, a clinical recrudescence frequently occurred. In a few of the more acute cases the second and third courses of emetine were given at eight to ten day intervals with no untoward effects. It may be necessary to shorten the rest periods in this manner if a recrudescence with fever occurs.

Except for the occasional weakness and fall in blood pressure during the first course of emetine, no toxic effects were seen.

The total emetine dose required to effect cure varied with the type of hepatic amoebiasis. The abscess cases required the largest doses (average 21.9 grains in 47.6 days), the acute hepatitis somewhat less (average 14.4 grains in 33.4 days), and the subacute and chronic cases the least (average 11.2 and 12.4 grains respectively in 16.1 days).

The largest dose of emetine administered to any patient was 27 grains, the smallest 6 grains.

The response to emetine usually was so dramatic that it was considered diagnostic of the disease. Of the 69 patients treated, 68 were cured. One patient, though afebrile and greatly improved clinically, had a persistently enlarged and tender liver.

Relatively few cases of hepatic abscess requiring aspiration or drainage were seen in the theater. Captain Rogers and Colonel Elsom, in their study of 444 cases of amebiasis, at the 20th General Hospital, observed only 4 patients

with liver abscess. In the localization of such lesions, the possible usefulness of pneumoperitoneum was studied by Colonel Bercovitz and his associates at the 69th General Hospital. Their observations were not conclusive but indicated the possible value of this technique as a diagnostic adjunct. In the theater ETMD for August 1945, Col. Harry C. Hull, MC, and his associates at the 142d General Hospital reported a contribution, of considerable merit, to therapy of hepatic abscesses. These officers treated two patients with amebic abscess of the liver by closed drainage after visualization with diodrast. Both patients were gravely ill despite employment of all accepted measures, including repeated aspiration. Under local anesthesia, a catheter was inserted into the abscess cavity, closed drainage with suction was instituted, and penicillin injected daily into the abscess cavity and also intravenously. Both patients made full recovery.

To appraise the plan of treatment in use and to elaborate improved methods of therapy, a program of clinical investigation of the diarrheal diseases was planned and put into operation at the 142d General Hospital. The relative value of the oxyquinoline drugs, the evaluation of emetine and the possibility of either omitting it from the treatment of acute dysentery or substituting an oral preparation, the efficacy of the oxyquinoline derivatives in treatment of asymptomatic carriers, and the possible value of chemotherapy, such as use of the sulfonamides and/or penicillin, in affecting the secondary bacterial invaders in the bowel were some of the problems that were proposed for investigation. The end of hostilities interfered with the complete fulfillment of this program.

Followup observations.—The third medical approach was through followup observations of all patients in order to be certain that repeated tests of cure be made and therapy instituted in event of recurrences. Posttreatment examinations must be viewed as part of the management of the patient as well as part of the control of the spread of these diseases. The necessary transfer of personnel within the theater led to unsatisfactory followup of patients with amebiasis. Tests of patients' stools on return to duty after hospitalization usually were not performed. When patients reported to dispensaries or were readmitted to hospitals because of gastrointestinal complaints, records of previous hospitalization were not available. Results of previous clinical findings, the prior diagnoses and response to treatment were unknown. It was believed in the Office of the Surgeon, moreover, that the inadequately treated military personnel might, on their return to the Zone of Interior, present a public health problem as carriers. To remedy this situation, it was decided that an amebiasis register analogous to the syphilis register, should be initiated for each patient. This register contained a summary of all pertinent clinical data, results of examinations, and a summary of the treatment previously employed. The register was begun by the medical officer making the original diagnosis, was maintained by the medical officers currently in charge of treatment of the case, and was forwarded to the surgeon of the patient's new station or command. When a satisfactory result had been attained or when the patient was transferred out

of the theater, the register was forwarded to the Office of the Surgeon, Headquarters, USAFIBT. Besides the purposes of this register just mentioned, evaluation of the therapeutic regimes employed was made possible. When the registers were forwarded to the Surgeon General's Office at the conclusion of the war, they were studied and were made available on subsequent hospitalization of the patient in the Zone of Interior.

Only meager information was generally available regarding followup of patients hospitalized for amebiasis. Major Ellenberg and his associates, however, performed a 1-month followup stool examination in each of their 833 cases, a 3-month followup examination in 60 percent, and some were followed for varying periods up to 11 months.

Of particular interest were the results of their followup in 101 cases in the personnel of their own unit whom they were able to study with especial care. Twenty-six had been hospitalized because of clinical manifestations; the remaining 75 were asymptomatic carriers. All had a minimum followup period of 6 months, and 81 were followed monthly for 11 months. There were only 2 recurrences in this group of 101 cases; one a symptomatic and the other an asymptomatic case. As previously stated, the remarkable cure rate of 99 percent in the entire series is to be attributed in part to early diagnosis and effective treatment.

Of the 444 patients with amebic dysentery studied by Rogers and Elsom at the 20th General Hospital, 162 followups were requested and 84 (35 acute, 20 subacute, and 29 chronic) were obtained. The total followup period was from 3 to 6 months for 25 patients, 6 to 12 months for 24, and 12 to 23 months for 35. A summary of the findings in the 84 patients follows.

	<i>Findings</i>	<i>Number of cases</i>
History:		
Abnormal bowel habits.....		9
Periods of diarrhea.....		36
Abdominal pain.....		19
Sick call attendance.....		7
Weight loss.....		6
Weight gain.....		45
Physical examination:		
Liver palpable.....		3
Liver tender.....		1
Colon tender.....		10
Stool examination:		
Trophozoites.....		0
Cysts.....		2
Sigmoidoscopic examination:		
Active lesions.....		0
Healed scars, definite.....		3
Healed scars, possible.....		3
Total with history of findings suggesting a recurrence of amebic dysentery or chronic dysentery during followup period.....		0

At the various hospitals, readmission for amebiasis was not uncommon. In a theater where repeated exposure to infection was inevitable, one could not

confidently distinguish between recurrence and reinfection. Disposition to the Zone of Interior of patients with persistent disability despite therapy and of patients with persistent organic intestinal damage limited clinical experience with this important group of cases.

BACILLARY AND OTHER FORMS OF DYSENTERY

The numerous cases of dysentery prevailing in the India-Burma theater and the limited laboratory facilities generally prohibited detailed laboratory diagnostic study except in special instances. However, the Sub-Commission on Dysentery of the Army Epidemiological Board reported in November 1944 that, of 369 cases admitted to the 20th General Hospital because of diarrhea and of 175 cases seen in dispensaries, stools were positive for bacillary dysentery in 24 percent and 16 percent, respectively. As Colonel Blumgart advocated examination of stools for *E. histolytica* in every case and recommended equipment of the smaller installations and dispensaries with microscopes and the necessary laboratory supplies, this was done to an increasing extent. Except in field, station, evacuation, and general hospitals, mild cases of diarrhea usually were treated symptomatically and the more severe or protracted cases with chemotherapy. Patients treated on an ambulatory basis usually were given sulfaguanidine, which, although therapeutically inferior to sulfadiazine, was not attended by the dangers inherent in sulfadiazine. The hot climate in this theater during much of the year predisposed patients to dehydration and renal complications, particularly those patients with diarrhea whose fluid intake could not be supervised. Under the more favorable conditions of hospitalization, sulfadiazine was administered with excellent results in accord with TB MED 119, November 1944, entitled "Bacillary Dysentery." Most cases of "Delhi Belly" cleared rapidly regardless of the regime employed. Even in proved acute bacillary dysentery, the efficiency of chemotherapy was not always evident. Thus, in 300 Chinese patients studied by Major Elson, Maj. (later Lt. Col.) Dickinson S. Pepper, MC, and Lt. Col. (later Col.) James S. Forrester, MC, neither sulfaguanidine nor sulfadiazine shortened the course of disease or ameliorated the symptoms in comparison with the group of controls. However, the value of chemotherapy in the treatment of bacillary dysentery and in the prevention of the carrier state was generally impressive.

Differential diagnosis

The differential diagnosis of the diarrheal and dysenteric diseases in the India-Burma theater presented no unique or peculiar problems. As in other tropical and subtropical regions, the following possible diagnoses required consideration: Amebic dysentery; bacillary dysentery; simple diarrhea, including food poisoning; and parasitic infestations, such as hookworm and strongyloidiasis. The acute form of amebic dysentery could not be distinguished from bacillary dysentery with absolute confidence on clinical grounds alone. Concurrent bacillary and amebic infection was frequent; indeed,

according to various estimates, from 10 to 25 percent of patients with bacillary dysentery had amebiasis as well. In general, however, certain diagnostic considerations served as guides for differentiation. In amebic dysentery, the onset was usually less violent, the symptoms were apt to have existed for weeks rather than for hours, and the maximum number of bowel movements per day was characteristically from 5 to 10 rather than from 15 to 20 as in bacillary dysentery. High fever, prostration, and intense abdominal pain were less frequent in amebic dysentery; the leukocyte count was more likely to be normal or only slightly elevated; and the stools consisted primarily of feces containing blood, whereas in bacillary dysentery they often consisted only of a very small amount of odorless bloody mucus. Bacillary dysentery tended to subside even when not treated with sulfonamides, whereas amebic dysentery continued unabated or improved only slightly until specific treatment was instituted.

Simple diarrhea could be distinguished in the majority of cases by its more explosive onset, by its tendency to affect simultaneously a number of men in the same organization, by the absence of blood in the stools, and by its rapid subsidence within from 24 to 48 hours. Malaria was occasionally associated with bloody dysentery, but the abrupt onset of chills, a remittent type of fever of 104° F. or above, headache, and generalized bone, joint, and muscle pains were so highly characteristic of it and so atypical of amebic or bacillary dysentery that the differentiation was usually not difficult.

Hookworm disease and strongyloidiasis frequently gave rise to low-grade, generalized abdominal pains and diarrhea. The two diseases did not cause bloody stools, and the abdominal symptoms produced by them were usually less clearly colonic in origin, consisting rather of generalized or upper abdominal discomfort with indigestion. Finally, an important diagnostic consideration was the fact that certain localities in India and Burma were known to be highly endemic centers of amebic infection, and personnel from these areas were always to be suspected.

Conclusions

The effective treatment of patients by preventing their becoming carriers and by detecting and eliminating the carrier state in others undoubtedly was partly responsible for the reduced noneffective rate for the diarrheal and dysenteric diseases in 1945 (chart 8). Of equal if not greater importance was the improved sanitation throughout the theater.

Malaria

In a lecture on the importance of malaria in India, Lt. Col. (later Maj. Gen. Sir) Gordon Covell, Director, Malaria Institute of India, stated: "Although * * * the case mortality from malaria is probably less than one per cent, it has been estimated that in India alone the disease is directly responsible for more than one million deaths per annum in a normal year, whilst in years of great epidemics this figure may be greatly exceeded."³

³ Covell, G.: Lectures on Malaria. Health Bull. No. 5, New Delhi: Government of India Press, 1941.

This indicated the occurrence of malaria in approximately 100 million people in India each year, or in 1 of every 4 of the population. Into this situation U.S. Army troops were sent in 1942, many of them going to the Province of Assam, which was described in the 1943 annual report of the 20th General Hospital, as follows:

* * * a malaria infested area, one that is continually epidemic, as bad as any in the world * * *. From the best statistics available, the malaria infection rates of the native population were as high as 3,000 per 1,000 per annum, or 300 percent during the malarious season. The rate dropped to about 70 percent during the winter months or the so-called "non-malarious" season.

Lest it be thought that malaria was confined to the jungle regions such as Assam, one of the very first letters in the medical files may be cited, reporting an outbreak of malaria in a detachment of 20 men who traveled by rail from Karachi to Dinjan.⁴ Of the 20 men, 7 (35 percent) contracted malaria on the trip. This report was only the first of many to come to the theater surgeon's office. Any train trip that involved night travel, and all but the very shortest did, almost invariably resulted in new cases of malaria. In spite of control efforts, this situation still prevailed as late as August 1944. The 843d AAA Automatic Weapons Battalion, mobile, left Bombay for Teok on 7 August, arriving on 18 August. Of the 726 men in the battalion, 98 developed malaria within a month of arrival; as far as could be ascertained, 85 of the 98 contracted the malaria on that trip.⁵

Malaria control was grossly inadequate in most areas. Occasionally, as in New Delhi, moderately effective measures had been initiated; in August of 1942, only 12 cases occurred in U.S. military personnel stationed there.

However, during 1943 and 1944, most of the troops were in the parts of India where the malarial rate was highest and where there had been no control prior to their arrival. A highly effective malaria control program was immediately instituted by the Preventive Medicine Section, Office of the Surgeon, Headquarters, USAFCBI, in areas where United States troops were stationed (fig. 246). A description of the control program is available elsewhere. The following pages are concerned with the disease as encountered by the medical officers of the India-Burma theater.

Statistical observations

In all, 39,906 cases of malaria among U.S. troops were treated in the several years of the theater's existence. Knowledge of the disease was furthered, and valuable contributions to therapy were made. The great majority of the cases were seen in the 20th General and in the 48th and 73d Evacuation Hospitals in the Assam-Burma region along the beginning of the Ledo Road. Later, the 69th General Hospital and the 14th Evacuation Hospital also came into the Ledo area. Many reports and scientific papers were submitted from these

⁴Letter, Col. John M. Tamraz, MC, Surgeon, U.S. Army Forces in India, Burma, and China, to Chief of Staff, Services of Supply, 30 July 1942, subject: Malaria Contracted by Troops Traveling on Railways.

⁵Letter, Maj. Mason Trupp, MC, Assistant Surgeon, Headquarters, 10th Air Force, to Commanding General, 10th Air Force, 21 Oct. 1944, subject: Report of Excessive Number of Malaria Cases Within the 843d AAA AW Battalion.

installations, all stemming from the thousands of cases seen during the monsoon seasons of 1943 and 1944.

The material available for this review did not lend itself to a chronologic study in the sense that a day-by-day development of the malaria problem and its solution in the theater could easily be presented. Ideas conceived in 1943 frequently could not be completely developed until 1944, and in many instances the final report did not reach the theater surgeon until late in 1944 or early 1945. Consequently, it seemed best to present the material by subject, including under each heading all the ideas that were developed in sequence as nearly chronologically as the material permitted.

INCIDENCE

U.S. soldiers.—From 1 September 1942 to 30 June 1945, a total of 39,906 cases of malaria were reported in this theater. This figure included recurrences as well as original cases. Table 5 shows the total number of cases and the rates for each year. Chart 10 shows the attack rate by month for January 1943 through August 1945.

TABLE 5.—*Total cases (including recurrences) and attack rate for malaria in U.S. Army troops in India-Burma theater, 1 Sept. 1942–30 June 1945*¹

[Attack rate expressed as number of new admissions, plus secondary cases, plus recurrent cases per annum per 1,000 average strength]

Year	Total cases	Attack rate
1942 (1 Sept.–31 Dec.)	911	167
1943	8,316	183
1944	27,458	166
1945 (1 Jan.–30 June)	3,221	² 32
Total	39,906	

¹ Includes cases admitted in China prior to November 1944.

² This striking reduction of the malaria attack rate was due to the institution of the suppressive Atabrine program, February 1945, in the most highly malarious districts.

Source: Blumgart, Herrman L., and Pike, George M.: *History of Internal Medicine in India-Burma Theater* [Official record.]

Table 6 shows the malaria statistics of the two most active hospitals in the Assam-Burma area for the part of 1943 that these hospitals were functioning. The 20th General Hospital received patients beginning 3 April 1943 and the 73d Evacuation Hospital beginning 26 April 1943. The figures for the 73d Evacuation Hospital are incomplete in that the breakdown for the month of November was not available. However, these figures suffice to show that in a period less than the full year these two hospitals alone treated approximately 45 percent of all the cases of malaria in U.S. soldiers seen in 1943. The figures for the Chinese soldiers are of interest; cases were not included in the U.S. Army statistics, but are shown in table 6, as they formed a part of the experience of these hospitals.



FIGURE 246. Malaria control. A. Civilian contractor mosquito proofing army installation with hessian cloth and mosquito netting. B. Native teams organized to DDT-spray villages in vicinity of army installations.

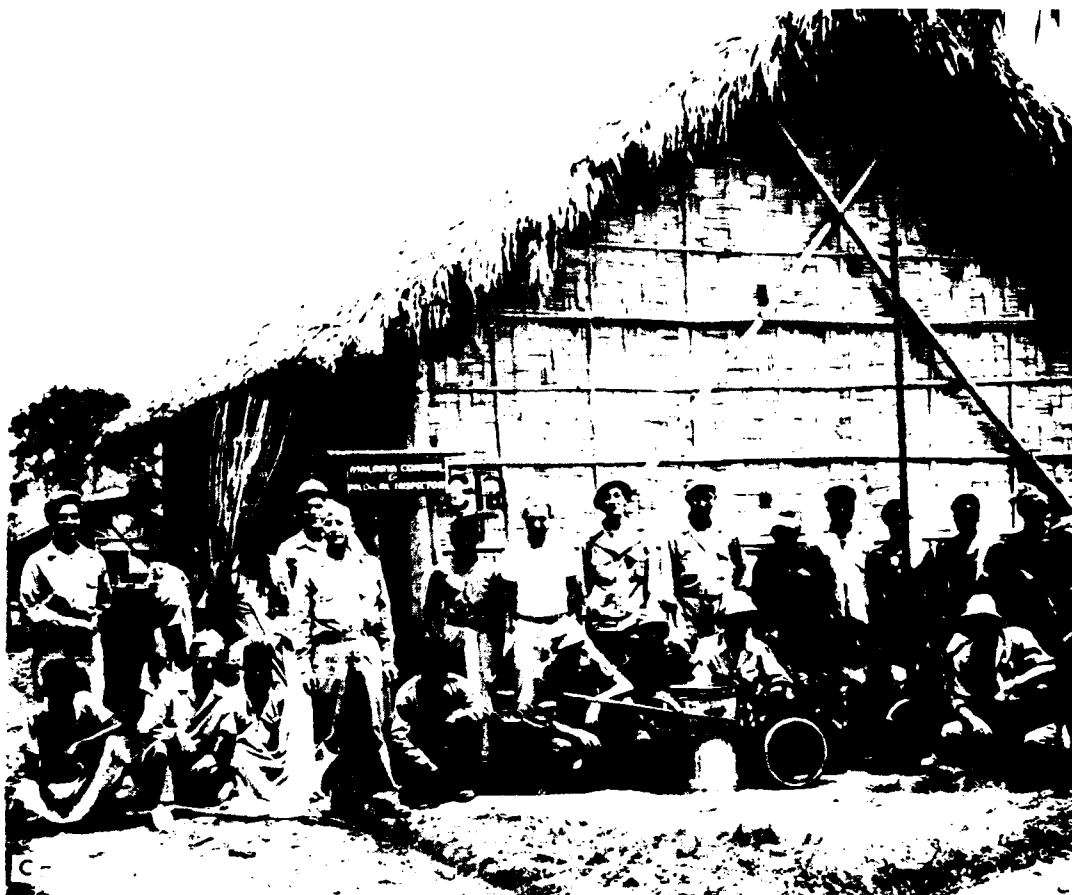


FIGURE 246. Continued. C. Malaria control and sanitation staff, 20th General Hospital.

Deaths from malaria among U.S. personnel were uncommon, and in each death that did occur cerebral malaria was the cause.

TABLE 6.—*Types of malaria observed in the 20th General Hospital and in the 73d Evacuation Hospital, April to December 1943*

Hospital	Estivo- autumnal <i>P. falciparum</i>	Tertian <i>P. vivax</i>	Quartan <i>P. malarie</i>	Mixed	Unclassi- fied	Only diag- nosed clin- ically	Total
20th General Hospital:							
American patients	908	1,024	28	13	733	191	2,897
Chinese patients	2,949	991	16	65	1,023	844	5,948
73d Evacuation Hospital:							
American patients	296	210	8	4	167	114	793
Chinese patients	2,027	590	15	16	1,423	1,008	4,779

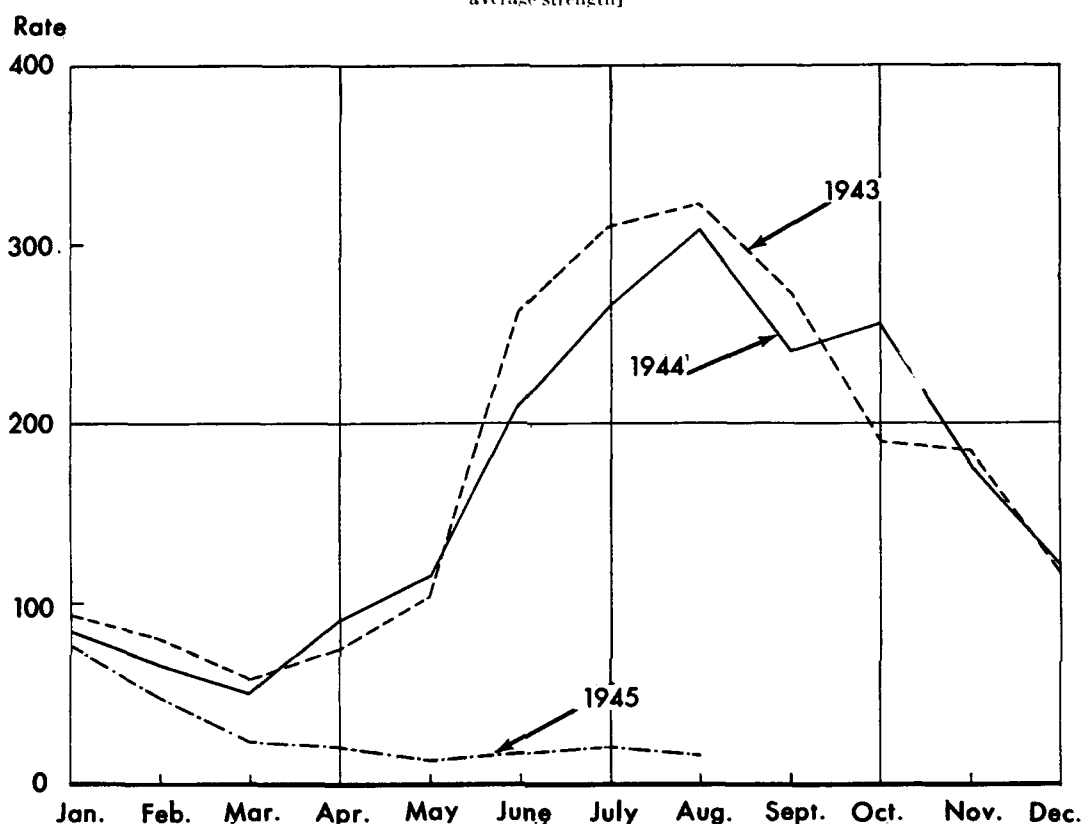
Figures for November not available.

Source: Blument, Herman L., and Pike, George M. *History of Internal Medicine in India-Burma Theater*. [Official record.]

CHART 10.—Monthly attack rate for malaria in U.S. Army troops in India-Burma theater, January 1943–August 1945¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions plus secondary diagnosis cases plus recurrent cases per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

Chinese soldiers.—The prevalence of malaria in the Chinese was due to many factors, the chief of which was the almost complete lack of interest in antimalaria precautions on the part of the Chinese. This was only another manifestation of the general lack of concern about health principles of any sort, and, indeed, lack of concern for life itself. It was also thought by some medical officers that the Chinese were inherently more susceptible to malaria, but whether this was a matter of racial susceptibility or a secondary result of the poor physical condition of all the Chinese troops flown to India from China was questionable. In any event, in the Chinese the incidence of infection from *Plasmodium falciparum* was much higher than in the Americans, the condition of patients on admission usually much worse, and deaths more frequent.

TYPES OF INFECTION

In U.S. personnel at the 20th General Hospital, during the period April 1943 through March 1944, there were approximately as many infections from *P. vivax* as from *P. falciparum*, whereas infections from *P. malariae* were uncom-

mon. Figures differed somewhat in the following year, when there was no appreciable change in the number of infections from *P. vivax* but a pronounced decrease in the number of infections from *P. falciparum* (table 7). The decrease in the latter reflected the decreased malaria rate; the high figure for malaria caused by *P. vivax* represented its tendency to recur. Infections with *P. malariae* remained relatively rare.

Mixed infections were considered much more common than the figures indicated. Under the pressure of a caseload so great that surgeons as well as internists were caring for malaria patients, a laboratory could do very little more than a single malaria smear, and, once a parasite was seen and the diagnosis established, the luxury of a continued search for other forms was not always possible. Mixed infections always showed *P. falciparum*; *P. vivax* was usually the other parasite. As far as can be determined from the available material, a mixed infection did not necessarily present added difficulties in treatment.

TABLE 7.—Types of malaria observed in U.S. Army troops at the 20th General Hospital, April 1943–March 1945

Hospital	Estivo-autumnal (<i>P. falciparum</i>)	Tertian (<i>P. vivax</i>)	Quartan (<i>P. malariae</i>)	Mixed	Unclassified	Only diagnosed clinically	Total
3 Apr. 43–31 Mar. 44	951	1,317	33	25	755	215	3,296
1 Apr. 44–21 Mar. 45	460	1,225	18	13	154	189	2,059

Source: Blumgart, Herrman L., and Pike, George M.: History of Internal Medicine in India-Burma Theater. [Official record.]

The unclassified group included all cases in which parasites were seen but the specific type not identified. It will be seen from table 6 that in 1943 approximately 25 percent of all the malaria cases seen at the 20th General Hospital and 21 percent of the cases seen at the 73d Evacuation Hospital fell into the unclassified group. Table 7 shows a pronounced drop in this figure at the 20th General Hospital in the following year. This difference represented a change in laboratory conditions. In 1943, with limited time and laboratory facilities, prolonged efforts to make an absolute identification were not justified. In 1944, with better laboratory facilities and more time, it was possible to make a reduction in the unclassified group. Capt. (later Maj.) Calvin F. Kay, MC, of the 20th General Hospital, reported on primary infections, reinfections, and relapses in the highly malarious district of Assam. In the unclassified infections in his study, Captain Kay reported that, when further smears were obtained and identification was possible, almost without exception the previously unidentified parasite proved to be *P. vivax*. From this finding and from the similarity of the relapse rates in this group to those in patients with malaria caused by *P. vivax*, Captain Kay was of the opinion that infections caused by *P. vivax* constituted the bulk of unclassified infections. In discussing this question, Captain Kay made the following statement:

"We had at first expected the reverse to be the case inasmuch as the later forms of *P. vivax* are more easily identified than those of *P. falciparum*. However, with the thick blood smears employed, in many instances large numbers of *P. vivax* trophozoites were present with none of the readily distinguishable later forms in evidence."

On the other hand, this opinion apparently was not universally held at that hospital, because Lt. Col. (later Col.) Thomas Fitz-Hugh, Jr., MC, Maj. (later Lt. Col.) Henry U. Hopkins, MC, and Major Pepper, in their report on cerebral malaria, stated: "We have also good grounds for believing that the majority of the 'Type Undetermined' and 'Clinical Only' groups are actually caused by *P. falciparum* infection." The medical officers at the 73d Evacuation Hospital were of the opinion that a large proportion of the unclassified cases were caused by *P. falciparum*, since this was the more commonly seen parasite in that region. They also felt that, inasmuch as an unclassified case signified insufficient parasites in the peripheral blood for a definite diagnosis and since the finding of few parasites in the peripheral blood was usually an indication of an infection from *P. falciparum*, this was further evidence that the unclassified group largely represented infections from *P. falciparum*.

The last subgroup in table 6 included patients in whom the diagnosis was made solely on clinical evidence without laboratory confirmation. In many instances, treatment had been started before the patient reached the hospital. Although some of these cases undoubtedly were not malaria, the subsequent course and response to treatment of most of them and the known fact that several factors contributed to the difficulty of obtaining positive smears made it evident that in the large majority the diagnosis was correct. Captain Kay, basing his opinion on recurrence rates and later rechecks on smears, concluded that 66 percent of his group of unclassified cases were due to infections from *P. vivax* and 33 percent to infections from *P. falciparum*.

RELAPSE RATES

Malaria relapses gave rise to the same problems in the India-Burma theater as elsewhere. Major Kay studied three organizations and calculated relapse rates in 499 individuals, of whom 407 were followed for at least 4 months. In individuals with one previous clinical attack of malaria, the relapse rate was 25 percent for the entire group, including patients with unclassified infections and those with infections caused by *P. vivax* and *P. falciparum*. Those patients who had malaria caused by infection from *P. falciparum* showed less than 5-percent relapse rate, and those with infections caused by *P. vivax* showed 34-percent relapse rate. In individuals who had already had one relapse, the rate rose to 75 percent. The figure of 34 percent, appreciably lower than the usually accepted figures for malaria relapse in other parts of the world, might have been greater had the cases been studied longer. The studies of the 73d Evacuation Hospital in a 6-month period showed a relapse rate of 9.7 percent following the initial attack.

The well-known fact that trauma, operations, and acute illnesses can produce a recurrence of a latent malaria infection was adequately demonstrated in the experience of this theater and led to the use of suppressive Atabrine therapy in patients hospitalized for any medical or surgical reason who gave a history of having had a previous attack of malaria.

Clinical aspects

The word "protean" has often been used in describing malaria manifestations; however, its frequent use does not make it any the less applicable. Medical officers who came to this theater from the United States had had very little experience with malaria before their arrival. Though textbooks and courses on tropical medicine have always emphasized that this disease, like syphilis, can be a great imitator, a doctor whose training and experience have always associated diarrhea with bacillary or amebic infection is not likely to consider malaria as a cause of watery stools. The difficulties in diagnosis are well described in the following extract from a personal communication from Col. Francis C. Wood, MC, Chief, Medical Service, 20th General Hospital:

We saw the abdominal malarias, often indistinguishable from acute appendicitis, the dysenteric malarias, that looked somewhat like bacillary dysentery except that the patients were more apt to have chills and a higher fever. We saw the post operative and post traumatic malarias; any fever was malaria till proved otherwise. We saw some very queer malaria pictures; our Chaplain had a typical attack of acute cholecystitis that turned out to be malaria.

Cerebral malaria.—Cerebral malaria was the major clinical problem. In the early days, when malaria cases were pouring in, filling both medical and surgical wards, the various manifestations of cerebral malaria were not fully appreciated.

The figures for incidence were somewhat variable, largely because of the varied opinion as to what constituted cerebral malaria. Whereas at first only those cases with convulsions, coma, or other severe cerebral symptoms were included in the classification, it later became apparent that drowsiness or mild behavior changes were early manifestations and such patients had to be treated accordingly. Colonel Wood, whose letter was just referred to, described the situation in these words: "At first we didn't know what to look for. We didn't know how drowsy a patient had to be to be suspected of early cerebral malaria. Eventually we found out that if, when awakened, a patient was not fully awake and able to tell you his name promptly, that patient needed careful watching."

At the three hospitals that saw practically all the cases of cerebral malaria, the average incidence of this manifestation in relation to the total number of malaria cases was 2.3 percent at the 20th General Hospital, 2.3 percent at the 48th Evacuation Hospital, and 1.1 percent at the 73d Evacuation Hospital (fig. 247), with an overall average of 1.9 percent. These figures included Chinese as well as U.S. troops. For U.S. personnel alone, the incidence at



FIGURE 247 734 Evacuation Hospital. A Recovery section. B American medical wards.



FIGURE 217. (Continued). C. Chinese medical wards.

the 20th General Hospital was 2.2 percent. Although the figure was not strikingly high, it is significant that most of the malaria deaths came from this group. Included in the annual report for 1943 of the 73d Evacuation Hospital was a special report on malaria by Lt. Col. (later Col.) Edward R. Ware, MC, and his associates. In this study, which covered a 6-month period, there were 57 cases of cerebral malaria with 27 deaths, a mortality of 46 percent. Only one of the 27 deaths occurred in an American. From the 20th General Hospital, Colonel Fitz-Hugh and his coworkers reported a mortality of 33 percent in Chinese patients and 5 percent in Americans. The 48th Evacuation Hospital, which treated chiefly Chinese troops, reported a 43 percent mortality in them and no deaths in U.S. personnel for the period from 1 April 1944 to 16 March 1945.⁶ The 14th Evacuation Hospital, reporting on all its cerebral malaria cases from its opening in September 1943 to May 1945, had a total of 121 cases with 33 deaths, a rate of 27.3 percent; all deaths occurred in Chinese soldiers.⁷ Although these figures do not all cover the same period and better methods for diagnosis and treatment were available as time went on, it was apparent that the mortality for cerebral malaria made this a disease that required alertness in diagnosis and prompt action in starting treatment.

⁶ *Annual Report of Medical Dept., USAFIBH*, 1944 (July 1945).

⁷ *Annual Report of Medical Dept., USAFIBH*, 1945 (1 Sept. 1945).

The etiologic agent in cerebral malaria has generally been accepted as *P. falciparum* and in rare instances as *P. vivax*. Practically all the data that were collected supported this conception. Although Colonel Fitz-Hugh and associates made the statement that "cerebral malaria is chiefly if not exclusively a result of *P. falciparum* infestation * * *," a table in their paper reveals 5 cases of cerebral malaria attributed to *P. vivax*—1 case in an American and 4 in Chinese. The 14th Evacuation Hospital staff emphasized the fact that *P. vivax* can be a cause of cerebral malaria. Although the possibility of a double infection in which *P. falciparum* was overlooked must be considered, the clinical impressions of these men together with laboratory findings cannot be disregarded.

The clinical picture of cerebral malaria has been described by many authors and has been particularly well presented by Colonel Fitz-Hugh and his associates. All variations of cerebral manifestations were seen, from mild dizziness or slight drowsiness to severe headache, coma, and convulsions. Temperature charts showed no constant pattern, and a normal or slightly elevated temperature did not necessarily indicate improvement. Some cases that were admitted as ordinary malaria and seemed to be responding properly to treatment showed severe cerebral symptoms several days after admission. No adequate explanation for this was found, but it was observed that hypoglycemia was occasionally a factor in prolonging cerebral symptomatology.

An interesting clinical observation, made at the 20th General Hospital in June 1945, was brought to the attention of this author by Colonel Wood. When a group of Chinese patients with malaria received no treatment for a period of several days preparatory to the use of a new drug, fraxine, all the patients with infection due to *P. vivax* became symptom free in 4 days without therapy, but the infections from *P. falciparum* did not subside spontaneously. Colonel Wood believed that this experience suggested why more infections from *P. vivax* were seen in American and more infections from *P. falciparum* in Chinese patients; the Chinese with infections from *P. vivax* recovered spontaneously and did not come to the hospital, leaving a relatively high proportion of patients with malaria due to *P. falciparum* to be hospitalized.

Treatment

The CBI theater was established in March 1942. As far as can be determined, the first publication on the subject of treatment of malaria appeared in first theater *Field Medical Bulletin*, published in August 1942, and was a summary of a pamphlet issued by the British War Office. The treatment recommended was different from that recommended by Circular Letter No. 56, Office of the Surgeon General, U.S. Army, 9 June 1941, entitled "Notes on the Treatment and Control of Certain Tropical Diseases," which was still in effect. In the November 1942 issue of the CBI *Field Medical Bulletin*, another article on therapy appeared by Maj. (later Lt. Col.) Sydney P. Waud, MC, and Maj. (later Lt. Col.) Robert S. Crew, MC, of the 159th Station Hospital. These authors mentioned that the article in the August issue recommended a

treatment not in line with Circular Letter No. 56, and they went on to present several changes in the treatment of malaria gleaned from the School of Tropical Medicine in Calcutta, India. These also were different from the recommendations of The Surgeon General.

Finally, in the January 1943 issue of the theater *Field Medical Bulletin*, The Surgeon General's authority was recognized by reprinting Circular Letter No. 135, Office of the Surgeon General, U.S. Army, 21 October 1942, subject: The Treatment and Clinical Prophylaxis of Malaria. By January 1943, Circular Letter No. 135 had received complete distribution in the theater, and in the February 1943 issue of the *Field Medical Bulletin*, Lt. Col. Gordon S. Seagrave, MC, expressed doubts regarding the efficacy of Atabrine. He also presented his own views on the therapy of malaria, which included the use of liquor arsenicalis and neoarsphenamine.

The theater as a whole continued to use the plan of treatment outlined in Circular Letter No. 135 (October 1942) and in Circular Letter No. 33 (Office of the Surgeon General, February 1943), changing to Circular Letter No. 153, Office of the Surgeon General, U.S. Army, 19 August 1943, subject: The Drug Treatment of Malaria, Suppressive and Clinical, when this was received. By the end of 1943, installations in the heavily infested areas had sufficient experience to reach their own conclusions about the efficacy of the different methods of treatment. In the special report on malaria by Colonel Ware and his associates at the 73d Evacuation Hospital, it was concluded that all methods currently in use at that hospital were equally effective insofar as end results were concerned but that the treatment recommended by Circular Letter No. 153 did not reduce the temperature as rapidly as methods employing quinine and Atabrine in combination. This was very nicely demonstrated by a graph which accompanied the special report. The same conclusion was reached by the 20th General Hospital in the monthly sanitary report, dated December 1943, which states:

In accordance with instructions received from The Surgeon General (Circular Letter #153) quinine was withheld from all patients save those particularly ill, and the entire treatment carried on with Atabrine. The results have not been statistically analyzed, but there seems no doubt that the patients thus treated have a longer and more severe course and several cases of cerebral malaria have developed after some days of this therapy.

The 48th Evacuation Hospital evidently was also somewhat concerned about the effectiveness of the therapy recommended by The Surgeon General, because, in addition to the recommended plan of treatment, Lt. Col. (later Col.) Herman A. Lawson, MC, and Capt. (later Maj.) John A. Dillon, MC, treated a group of Chinese patients with a somewhat larger total dose. They reported the results in the April 1944 issue of the *Field Medical Bulletin*. The conclusion was that the treatment recommended by Circular Letter No. 153 was satisfactory and no clear-cut advantage was demonstrated in the use of larger doses of Atabrine. The experience of the theater with Circular Letter No. 153 was summarized in the theater ETMD dated 30 July 1944. The general opinion was that the results were satisfactory and that only in the

very sick patients was it necessary to supplement Atabrine treatment with quinine, usually intravenously. This will be taken up later under the treatment of cerebral malaria.

STUDIES WITH VARIOUS DRUGS AND COMBINATIONS

During this period when Circular Letters No. 135 (for 1942) and No. 33 and No. 153 (for 1943) were in effect, which included all of 1943 and most of the malaria season of 1944, occasional investigations were carried on, particularly at the 20th General Hospital, to determine the effectiveness of other drugs or combinations other than those recommended in Circular Letter No. 153. Observations were also made on the usefulness and side effects of the commonly used drugs. The following paragraphs summarize these observations.

Plasmoquin (pamaquine naphthoate).—The hospitals in the Assam-Burma region, in which Negro troops were stationed, soon discovered that Plasmoquin, always recognized as a moderately toxic drug, was particularly dangerous in Negroes, producing a severe hemolytic reaction. Because of the frequency and severity of the reaction, this drug was eliminated from the therapy program in all the hospitals in that area and eventually in the theater.

Fraxine.—This drug, of unknown composition, was tried at the 20th General Hospital on Chinese troops and reported on in that hospital's sanitary report, dated December 1943. It had been sent by the Chinese for testing as an antimalaria agent. It was completely ineffective in malignant tertian malaria, and its value in benign tertian malaria was open to question, since it was during this study that it was found that Chinese with malaria caused by *P. vivax* recovered spontaneously if untreated.

Arsenicals.—Arsenicals had long been recommended in the treatment of malaria. Although it had already been established that alone they had no effect in preventing relapse or, for that matter, in preventing initial infection by the malaria parasites, Major Kay, at the 20th General Hospital, undertook a study of the treatment of benign tertian relapses with a combination of Atabrine and Mapharsen (oxophenarsine hydrochloride). No beneficial effects were observed in the use of the combination of drugs; relapses occurred with the same frequency in the Atabrine-Mapharsen group as they did in the group treated with Atabrine alone.

Atabrine.—Problems occasionally arose in the hospitals of the Assam-Burma region that were peculiar to that locality and required special solutions. This was owing to the large number of Chinese troops in the area for whom the U.S. Army hospitals provided medical care. Although the problems were precipitated by the Chinese, the solutions frequently had a more general value and contributed interesting and useful information. One such problem was the difficulty in keeping Chinese patients in the hospital long enough to be given full antimalarial courses of treatment. As soon as the patients felt well, they left the hospital or were taken out by their commanding officers. In an effort to circumvent this, Maj. Thomas E. Machella, MC, Capt. Roger A. Lewis, MC,

and T/3 L. J. Kimmelman, of the 20th General Hospital, worked out a plan to give almost the complete week's dose of Atabrine in the first 24 hours of treatment. It was felt that, if this method proved to be safe and effective, it would insure adequate dosage and at the same time shorten the hospital stay legitimately. The dosage used was 0.3 grams of Atabrine every 3 hours for 8 doses. Patients so treated were compared with other groups treated on different schedules. The final result compared favorably with other plans of treatment. In fact, the duration of fever and of parasitemia was less than usually observed in patients treated according to Circular Letter No. 153. Because 2 of 80 patients developed signs of stimulation of the central nervous system, the authors reduced the dosage to 0.2 grams every 3 hours for 8 doses. This seemed to be as effective as the original dose.

At various times, new drugs were sent into the theater for trial. One such drug was called SN 6911 Bisulfate. This drug was tested at the 20th General Hospital by Major Machella and Sergeant Kimmelman. It was given as a single intravenous infusion and compared with a corresponding dose of Atabrine, also given as a single intravenous dose. The drug was found to be effective but to have no advantages over Atabrine.

Major Machella, with 2d Lt. David F. Burgoon, SnC, and T/3 R. Fine, also studied the effects of the two drugs on the liver. Concerned primarily with the effect of a single intravenous dose of Atabrine or SN 6911, Major Machella limited the study to determination of Bromsulphalein (sulfobromophthalein sodium) excretion before, during, and after an attack of malaria. He found a definite impairment of the ability of the liver to excrete the dye during the period of fever; this impairment disappeared in the majority of cases within 96 hours after the institution of therapy and usually within from 48 to 72 hours after subsidence of fever. In general, the more prolonged the fever, the greater the dye retention; but in all but four cases the retention was only temporary. Those four cases all showed slight jaundice on admission. That the dye retention was related to the fever rather than to the disease per se was demonstrated by normal controls with artificially induced fever (typhoid vaccine) showing a similar degree of dye retention. It was impossible to demonstrate any effect of Atabrine or SN 6911 on the ability of the liver to excrete Bromsulphalein.

Failure to respond to oral administration of Atabrine was not common but did occur on a few occasions. Lt. Col. Frank B. Cutts, MC, and Capt. (later Maj.) Irving A. Beck, MC, of the 48th Evacuation Hospital reported in the April 1945 India-Burma theater *Field Medical Bulletin* on 8 cases, out of approximately 4,500, that did not show a typical response to oral administration of Atabrine. In 3 of the 8, the therapeutic response was delayed but eventually appeared. In the remaining five cases, there was no response. Atabrine was not found in the urine of any of these patients, and, since it was believed that they were taking the tablets, it was concluded that there was no absorption of the drug. Intramuscular Atabrine produced a prompt response and the appearance of the drug in the urine.

DRUG REACTIONS

Plasmoquin.—All three drugs used in the treatment of malaria produced reactions. Plasmoquin had always been known as a toxic drug and proved to be particularly toxic in Negro soldiers. Both the 73d Evacuation Hospital and the 20th General Hospital had occasion to treat Negro troops since many Negro units were working along the Ledo Road. A severe type of hemolytic reaction was the most serious difficulty associated with Plasmoquin therapy. The 20th General Hospital, in its annual report for 1943, reported on approximately 20 instances of this reaction, all in Negro troops. The 73d Evacuation Hospital witnessed 10 such reactions—9 in Negroes and 1 in a Chinese soldier. All patients developed a moderately severe anemia; in 6 of the 10 patients at the 73d Evacuation Hospital the red blood cell count fell below two million. Because of the severity of these reactions, Plasmoquin was omitted from routine antimalaria therapy. There were also lesser reactions to Plasmoquin, such as gastrointestinal disturbances, cyanosis, hepatitis, and drug fever.

Quinine.—This drug had long been known to produce toxic effects, but, because the value of the drug as an antimalaria agent outweighed the disadvantages of its toxic reactions, its use was continued. It was administered intravenously in all cases of cerebral malaria prior to the availability of parenteral Atabrine and was generally considered to be a life-saving procedure. On the other hand, in the experience of the 48th Evacuation Hospital, as reported in the theater ETMD for June 1945, intravenous administration of quinine was very dangerous. Eight Chinese patients died in convulsions very shortly after the injection of quinine. Although it was admitted that a definite cause and effect relationship could not be proved, the clinical impression was so strong that the investigators at this hospital felt that any reasonable alternative was preferable to intravenous injection of quinine.

Atabrine.—Reactions to Atabrine constitute a history in themselves. This theater saw all of the reactions commonly attributed to Atabrine, including atypical lichen planus and various other skin reactions (p. 776), toxic psychoses, and the usual gastrointestinal disturbances. When Atabrine suppressive treatment was instituted in February 1945, there was apprehension in many groups regarding its toxic potentialities. Many symptoms were attributed to Atabrine without definite proof of a causal relationship. There were, however, occasional instances of unusual manifestations that were reasonably attributed to Atabrine. Col. Edward A. Abbey, MC, and Maj. Edgar A. Lawrence, MC, Surgeon, and Chief, Preventive Medicine Section, of the India-China Division, Air Transport Command, respectively, reported a study of the effects of continued doses of Atabrine (0.1 gram daily) on visual acuity of pilots. They concluded that Atabrine in the dose used had no effect on visual acuity except in rare, highly sensitive individuals. Their report included a single case of ocular sensitivity to Atabrine characterized by blurring of vision and change in visual acuity in both eyes from 20/30 to 20/50. Discontinuance of Atabrine resulted in relief of symptoms; readministration of the drug resulted in a recurrence, relieved by cessation of suppressive therapy.

CEREBRAL MALARIA

Whereas Atabrine given orally practically always produced good results in the usual case, it was frequently ineffective in cerebral malaria, and other measures had to be instituted. This was largely owing to the fact that patients with cerebral malaria were unable to take oral medication and required more intensive treatment. Patients with cerebral malaria who were responding favorably to oral treatment frequently suffered relapse after 3 or 4 days. In the early days of the theater when parenteral Atabrine was not available, practically all installations used intravenous quinine. Later, intramuscular and intravenous injections of Atabrine were used with excellent results.

In the ETMD for June 1945, Major Machella summarized the results in five cases of cerebral malaria treated with a single intravenous infusion of Atabrine. The dose varied from 0.6 gram to 1.0 gram, administered in 1,000 cc. of physiologic saline. One patient, in coma on admission, expired in 31 hours; he had received 0.8 gram of Atabrine intravenously. Two patients who received the infusion too rapidly had brief psychotic episodes which lasted less than 24 hours. When the infusion was given slowly, no toxic manifestations were noted. No conclusions regarding the relative merits of parenteral quinine and Atabrine were drawn from this very small series of cases; however, Major Machella felt that Atabrine was at least as effective as quinine and that 0.8 gram of Atabrine administered in a slow intravenous drip provided an effective method of clearing the blood of parasites.

Aside from the specific drug therapy of cerebral malaria, certain general measures were tried. Some appeared to be of benefit; others were discarded. They were as follows:

1. *Spinal tap*.—There were no consistent results from this procedure. The group at the 20th General Hospital found it extremely useful and felt that an initial spinal tap was always advisable, whereas at the 73d Evacuation Hospital only in occasional cases did lumbar puncture, with reduction of the spinal-fluid pressure, have any appreciable effects. In most cases, it was of no avail.

2. *Transfusion of whole blood*.—The medical officers at the 20th General Hospital felt that whole blood transfusion was, at times, a life-saving procedure, particularly in cases with pulmonary edema.

3. *Intravenous Adrenalin (epinephrine)*.—This drug was used by the 20th General Hospital and the 73d Evacuation Hospital. It was considered to be of value in some cases; however, because of untoward reactions, its routine use was not advised.

4. *Sedation*.—This measure was used universally in excited or convulsive cases. Intravenous Sodium Amytal (amobarbital sodium) and intravenous paraldehyde were used most often.

5. *Other measures*.—Various other measures were tried, particularly at the 20th General Hospital. These included oxygen therapy, Benzedrine (amphetamine), ephedrine, aminophylline intravenously and by intracarotid

injection, and also nitroglycerin into the carotid. No striking results were obtained from these measures.

A suggestion that resulted in much correspondence was submitted by Capt. (later Maj.) Mason Trupp, MC, an Army Air Force surgeon. He recommended the combined use of nicotinic acid and oxygen, the nicotinic acid to increase the cerebral blood flow and the oxygen to relieve the anoxemia produced by the plugging of the cerebral capillaries by parasites and pigment. For some reason, the suggestion received only a limited trial. A few cases were treated at the 234th General Hospital in Chabua, India, and occasional cases elsewhere, but no adequate clinical trial was ever given.

Evacuation policy

In general, the results of malaria treatment recommended in the directives from The Surgeon General were excellent, and very few patients, mostly cases of blackwater fever and several cerebral cases, required evacuation to the Zone of Interior.

Scrub Typhus

At least since 1932, typhus fever—louseborne, tickborne, fleaborne, and miteborne—has been known to exist in Burma. Interestingly enough, however, the first reported case of scrub typhus in the India-Burma theater came not from Burma but from India where a civilian technical representative had been admitted to the 100th Station Hospital at Delhi, India, on 2 October 1943, with fever and mild meningeal signs. Agglutination of OXK strain of *Proteus* to 1/2500 was found on the 10th day of hospitalization, and complement-fixation tests done later in Washington likewise indicated that the disease was scrub typhus. The history in this case revealed that the patient had just returned from Kunming, China, where several other cases of typhus had been reported. The other cases were proved later to be of the epidemic variety; only the one case was proved to be scrub typhus.

The chief focus of scrub typhus in the India-Burma theater was Burma. In November 1943, Chinese troops, stationed in Chinglow and Shingbuiyang, in Burma, began to develop a disease that at first was thought to be measles but later was diagnosed as a form of typhus fever.⁸ In one company of the 114th Infantry, 28 cases occurred with 4 deaths. At the end of November 1943, two U.S. soldiers suspected of having this disease were hospitalized at the 20th General Hospital, and shortly afterwards Maj. Walter S. Jones, MC, who had been assigned to the Chinese as liaison officer and had also made a trip to Shingbuiyang, developed an acute illness which, following the appearance of a rash on the fifth day, was diagnosed as mite typhus. His own subjective reactions to this disease are described in detail in his 1 August 1945 report to the theater surgeon on his activities with the Chinese.

⁸ Letter, Col. Elias E. Cooley, MC, Medical Inspector, to Theater Surgeon, CBI, 13 Dec. 1943, subject: Report of Outbreak of Rickettsial-like Disease in Chinese Troops.



FIGURE 248. Tick-infested jungle at 23-mile mark along the Lado Road.

In December 1943, Major Pepper studied all the cases then at the 20th General Hospital and in addition traveled down the Lado Road to investigate the focus of infection around Shingbwiyang (fig. 248). He discussed his findings with Maj. (later Lt. Col.) William L. Jellison of the U.S. Public Health Service, who was of the opinion that a mite was the most likely vector because, if fleas, ticks, or lice were the vectors, not only would there be a history and signs of bites but the insects themselves would be found. Mites, on the other hand, would be practically impossible to find and would not leave visible bites.

Consequently, in his report on his investigations which he submitted on 9 December 1943 to the Surgeon, Base Section No. 3, Major Pepper concluded:

"The disease seen both in the Lado Road section of Assam and in the region of Shingbwiyang is a form of miteborne rickettsial disease which closely resembles the mite typhus, tropical typhus, rural typhus of Malaya or Sumatra, scrub typhus etc. of the literature."

Captured Japanese medical reports indicated that the enemy was encountering the same disease among their troops. The reports show that there was some doubt in the minds of Japanese medical officers regarding its proper classification. They called it eruptive fever, found that it was caused by rickettsial bodies, and felt that it was closely related to Japanese

river fever (Tsutsugamushi disease). Their reluctance to identify it specifically as Tsutsugamushi disease was apparently due to their failure to find the typical ulcer in most of the cases. In one group of 29 patients, only 2 showed the characteristic eschar. The descriptions presented in the captured reports leave no doubt that this was the same disease that was then appearing in Chinese and U.S. troops.

The British were having their own difficulties with this infection. Report No. 433 of the Joint Intelligence Collecting Agency, China-Burma-India theater, dated 24 February 1944, described an outbreak in the 1st Devon Regiment, which occurred between 21 October and 17 November 1943. Of particular interest in this report is a graph showing the number of cases that developed day by day and their relationship to the time the group entered and left the infected focus.

The initial outbreak of mite typhus among U.S. troops was of relatively brief duration. The first cases appeared in November 1943 and a considerable number in December 1943, but by January 1944 the incidence had fallen sharply. Col. Elias E. Cooley, MC, Medical Inspector, USAFCBI, submitted a preliminary report on scrub typhus among U.S. and Chinese troops in India-Burma, in which he included a report on the clinical aspects of the disease by Major Pepper and a report on possible vectors by Capt. (later Maj.) Virgil I. Miles, SnC, entomologist of the 18th Malaria Survey Unit. Maj. (later Lt. Col.) John T. Smiley, MC, Surgeon, Base Section No. 3, then prepared a final report, dated 20 April 1944, summarizing the situation. His findings confirmed those already arrived at by Major Pepper. In addition, Major Smiley came to the following conclusions: "It is highly likely that sporadic cases occurred throughout the year; however, these have been recorded as fever of unknown origin inasmuch as no serologic studies were done, but there seems to be a definite seasonal increase in the disease during November and December."

The concept of seasonal incidence developed support as time passed. However, there was good reason to believe that this factor was more apparent than real (p. 746).

A second outbreak of the disease began in April 1944 and lasted through July 1944. These cases were limited almost entirely to troops taking part in the battle around Myitkyina, Burma, chiefly to the group known as Merrill's Marauders (5307th Composite Unit (Prov.)) (fig. 249). There were 148 cases with 17 deaths. Writing about this outbreak to the Surgeon, USAFCBI, on 23 August 1944, Maj. (later Lt. Col.) Kirk T. Mosley, the theater epidemiologist, said:

The outbreak of scrub typhus fever occurred while this force was engaged on a combat mission to clear the enemy out of North Burma, especially in the general region of the route of the Ledo Road. The area covered by the 5307th Composite Unit (Prov) during this period was in the lower ranges and foothills of the North Burma mountains where the head-waters and tributaries of the Mogaung, Tinai, and Irrawaddy rivers are located. These streams or their tributaries were crossed a number of times and sites along their banks



FIGURE 249.—Brig. Gen. Frank Merrill, USA, Commanding General, 5307th Composite Unit, Provisional, Merrill's Marauders, with interpreters.

were frequently used as bivouac areas. The establishment of bivouacs on the banks of these streams may be an important feature in the epidemiology of the outbreak and offers a reasonable explanation of the occurrence and distribution of cases among the three (3) battalions and also the distribution within the component elements of each battalion (fig. 250).

Cases continued to appear during August and September but not in excessive numbers. In October, November, and December of 1944 and in January 1945, the number of cases rose sharply. There was a lower death rate in the third outbreak, and the disease was in general not so severe as in the previous epidemics. These cases came largely from troops stationed at Camp Landis who had taken part in the last stages of the Burma campaign.

Excellent descriptions of scrub typhus have been prepared by the medical officers with considerable personal experience with this disease. Major Machella and Colonel Forrester, of the 20th General Hospital, reported on 64 cases seen in the first outbreak. Capt. Clarence M. Agress, MC, and Capt. Edward R. Evans, MC, of the 73d Evacuation Hospital, reported on a survey of 86 cases seen in the first and second outbreaks. At the 29 January 1945 British Army Medical Congress, Colonel Wood, 1st Lt. (later Capt.) John J. Sayen, MC, and Capt. Harold S. Pond, MC, submitted a paper that briefly summarized the findings in some 600 cases seen at the 20th General Hospital. Finally, these latter three officers, along with Colonel Forrester, prepared a comprehensive clinical review of the 616 cases seen at the 20th General Hospital.



FIGURE 250. Bivouac area at 12-mile mark along Ledo Road.

Statistics

Incidence. Chart 11 shows the number of cases per month of scrub typhus in U.S. troops from December 1943 to July 1945. Deaths are also indicated. Although at first glance one might suspect a seasonal incidence, with peaks in late fall and spring, this distribution in all probability was related to the movement of the troops into infected areas during those months rather than the season of the year per se. There was a total of 726 cases and 52 deaths in U.S. Army personnel.

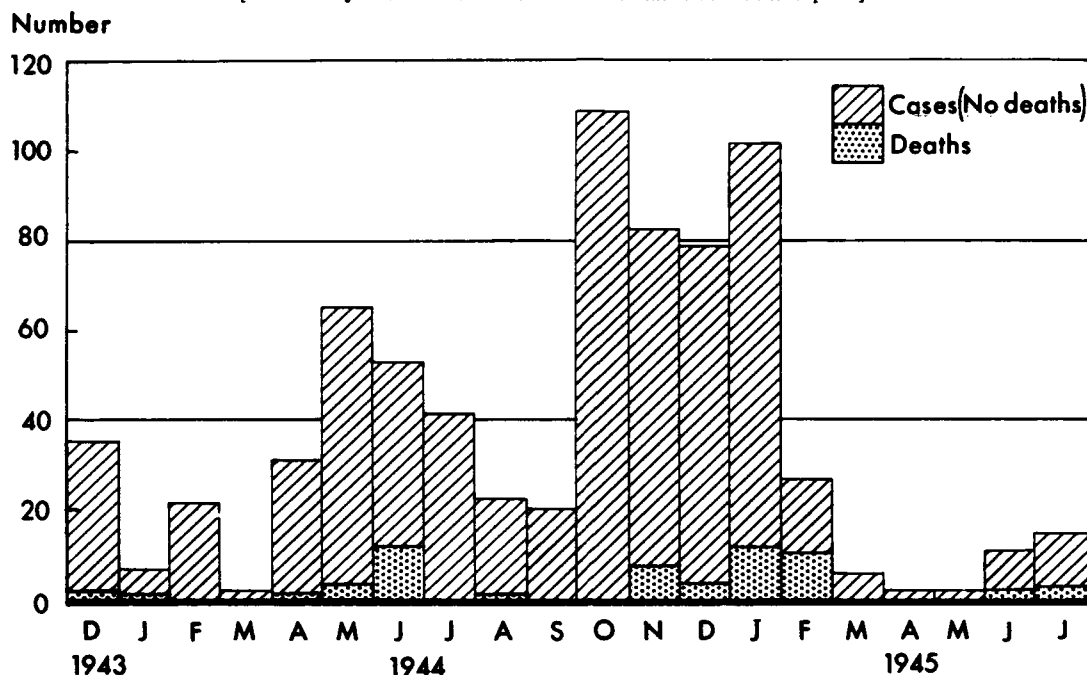
Mortality. The overall case fatality ratio in U.S. troops was approximately 7 percent, although in the first two outbreaks it was almost 12 percent. The chief factor in producing the higher mortality may well have been the poor physical condition of the troops on arrival at the hospital. Many of the men in the Myitkyina campaign, already acutely ill, were forced to march for several days to reach an evacuation point.

On 28 May 1944, in a preliminary report to the Commanding Officer, 20th General Hospital, Lieutenant Sayen, officer in charge of the typhus investigation at that hospital, made the following comment on the epidemiology of the second outbreak:

The mortality of the present Scrub Typhus Epidemic is considerably higher, and the individual patients are more severely and prolongedly ill than was the case in the outbreak which occurred late in 1943. This seems directly caused by the physical condition of the

CHART 11.—Incidence and deaths due to scrub typhus fever in U.S. Army troops in India-Burma theater, 1 December 1943–31 July 1945 ¹

[Preliminary data based on summaries of statistical health reports]



¹ Includes cases admitted in China prior to November 1944.

troops when they acquired the infection. The 1943 American victims were supply or liaison troops in relative sound health. The present group is composed of exhausted, malnourished men; often not evacuated from the battle front until several days after the onset of typhus. Not infrequently the patients suffer from simultaneous diseases, particularly amoebiasis and malaria. The importance of early evacuation, institution of bed-rest, nursing care and proper nutrition, as well as the treatment of concomitant diseases for which specific therapy is available cannot be overestimated.

Clinical aspects

There is nothing characteristic of the early symptoms that distinguishes this disease from any other acute infectious process.

Incubation period.—The incubation period is always difficult to determine in diseases with gradual onset and indefinite time of exposure. In two medical officers, who were in a known typhus focus for only 4 days, it was from 9 to 13 days in one and from 10 to 14 days in the other. One had a typical skin lesion 2 days, the other 4 days, before the onset of fever. The incubation period for the fever in these two cases corresponded closely with the one determined by the British, which was from 9 to 17 days for 121 cases.

Signs.—Three physical findings were found sufficiently characteristic to make them of considerable diagnostic importance. These were the typical eschar, generalized lymphadenitis, and the rash.

The following tabulation shows the incidence of these signs in the series of 600 cases reported on by Colonel Wood and Captains Sayen and Pond from

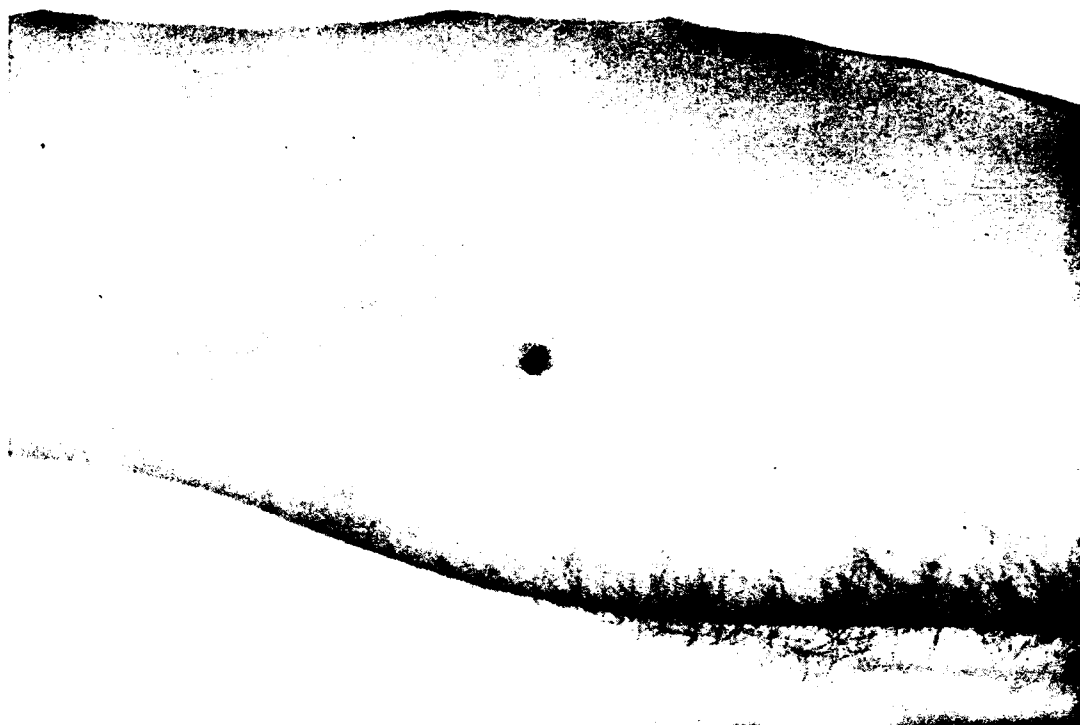


FIGURE 251. Scrub typhus (Tsutsugamushi disease). Typical eschar where mite larva penetrated skin in the antecubital.

the 20th General Hospital and in the 86 cases reported on by Captains Agress and Evans from the 73d Evacuation Hospital:

Incidence of Clinical Signs (in percent)

<i>Hospital</i>	<i>Eschar</i>	<i>Generalized lymphadenitis</i>	<i>Rash</i>
20th General	60	90	71
73d Evacuation	78	91	48

The eschar, shown in figure 251, was the most pathognomonic physical finding, although it was seen less frequently than lymphadenitis. Although the lesion was found on all parts of the body, in most cases it occurred on the trunk or in the axillae. Unusual sites were the eyelids, the penis, and the perianal region. More than one eschar was very rare; Colonel Wood and Captains Sayen and Pond mention one case. The importance of the eschar as a diagnostic sign lay in the fact that usually this primary lesion was present for several days before the actual onset of symptoms. If the lesions had been discovered and the significance recognized, the affected individuals might have started their arduous trip back to a hospital 2 or 3 days before the onset of the disease instead of moving deeper into the jungle, as they unquestionably did in groups such as Merrill's Marauders. The best descriptions of the eschar

were found in Lieutenant Sayen's preliminary report of 28 May 1944 and in the article on 616 cases of Captains Sayen and Pond and Colonels Forrester and Wood, the latter containing the following comment:

A typical primary ulcer, or eschar, of Scrub Typhus begins as an inflamed, painless papule which soon ulcerates, forming a central crater over which a dark, reddish-black scab forms. In moist areas, or when the scab is pulled off a deep ulcer with raised edges and thin yellowish-white exudate is seen. An essential characteristic is that it does not heal, possibly not until many days after the patient has recovered from his systemic symptoms. Although resembling other types of bites in its early phase, the mite ulcer shortly becomes so distinctive that it can scarcely fail to be recognized if seen. It is a raised lesion about the size of a dime with a black scab at the center (2 to 8 mm. in diameter) and a red, angry flare surrounding it for a distance of a centimeter or more. One or more regional lymph nodes soon become enlarged and tender and it is these rather than the symptomless ulcer which may attract the attention of the soldier. Since the eschar may occur anywhere on the body, commonly in moist, protected areas such as the axillae and the genital or perianal regions, a thorough search must be made of every suspected case. Medical corpsmen and line officers could probably be taught to recognize such lesions in addition to members of the Medical Corps.

Lesions on moist intertriginous surfaces (axillae, scrotum, perianal region) appeared as shallow, yellow-based ulcers without much surrounding hyperemia and without the black crust; consequently they were easy to overlook. Lesions on the hands and those below the popliteal space were often indistinguishable from the many cutaneous erosions and leech bites sustained by troops traversing the jungle * * *. The vast majority of patients did not report feeling any "bite." Secondary infection was rare * * *. The presence or character of the ulcer appeared to have no relation to any other manifestation of the disease, including the OXK titer and the severity.

The lymphadenopathy was the most frequent single physical finding. Generalized lymphadenitis was the rule, but it was common to find enlarged tender lymph nodes draining the site of the primary ulcer a day or two previous to the appearance of the generalized adenopathy. Because of the wide variability in the site of the eschar, careful search was necessary in order not to overlook the regional lymph nodes. The nodes were usually large and rubbery but at times small and firm.

Fever.—An irregular spiking type of temperature curve with double daily rises was regarded as characteristic of scrub typhus by Captain Sayen and his associates. It was exhibited by 70 percent of the patients at some time during the course of the disease. This characteristic type of curve was usually not persistent but was supplanted by long or short periods of remittent or sustained fever.

Laboratory findings

Agglutinations of the *Proteus* OXK antigen were found to be of the greatest diagnostic value. A detectable titer was not usually found until the 10th day of the disease or later. Opinions varied as to what constituted a diagnostic titer. Observers at the 20th General Hospital, using 1/100 as the diagnostic dilution, found only 55 percent of their 600 cases with this titer or a higher one. At the 73d Evacuation Hospital, observers considered a titer of 1/50 as strong evidence of scrub typhus; 70 percent of their 86 cases showed this or higher.



FIGURE 252. Scrub typhus (Tsumugamushi disease). Macular eruption characteristic of the disease.

The rash in most instances was a nonpruritic maculopapular eruption (fig. 252), which usually appeared between the 3d and 7th day of the disease and lasted from 5 to 7 days. It involved the trunk always and the extremities in about a third of the patients. The face was involved in 15 percent. It never involved the palms or the soles. There was no correlation between the appearance, character, or persistence of the rash and the severity of the disease. When florid or typical, the rash was diagnostic, but this occurred in only half the patients.

Late manifestations

In the first week of the disease, there were no unusual features that distinguished scrub typhus from any other severe generalized infection associated with marked toxemia. However, the average patient continued to have fever for approximately 3 weeks, and it was during the 2d and 3d week that such manifestations as typhus pneumonia, major involvement of the central nervous system with coma or convulsions, cardiovascular involvement, and hemorrhagic phenomena appeared. These complications were described in detail by the observers at the 20th General Hospital. They were the most

serious diagnostic and therapeutic problems; there were other less significant features, such as tender toes, conjunctivitis, deafness, visual disturbances, and edema of the face, hands, and feet.

Respiratory manifestations.—Involvement of the respiratory system was very common; almost every patient had bronchitis, and pneumonia was seen frequently. Colonel Wood and Captains Sayen and Pond concluded that the following points were most important in establishing the diagnosis of typhus pneumonia:

- a. The most important sign to look for is tachypnea, 35 or more per minute. When this persists for 2 or 3 days, a fairly extensive typhus pneumonia is probably present whether or not physical or roentgenologic signs confirm this suspicion.
- b. Less extensive typhus pneumonia is often indicated by persistent rales, impairment, and restricted breath sounds, in the absence of marked tachypnea.
- c. The ordinary roentgenologic signs of pulmonary consolidation are rarely seen. The chest film often shows nothing but prominent hilum and trunk shadows in a patient with extensive typhus pneumonia. Occasionally there is diffuse mottling. Typhus pneumonia is a lesion which is not adequately demonstrated by x-ray of the chest. When abnormalities are found they usually fail to indicate the true extent of the lesion. The occasional case will die with extensive typhus pneumonia without having had the degree of tachypnea indicated in (a), but this is rare. In conclusion, then, the most important clinical indicator of the condition of the lungs in scrub typhus is the respirator rate chart. It rarely fails to show a rate above 35 per minute for at least 2 days when the lesion is extensive enough to be of major clinical significance.

Cardiovascular findings.—In the cases observed at the 20th General Hospital, cardiovascular findings were summarized by Colonel Wood in the theater ETMD for March 1945. In 500 cases, no true congestive heart failure was seen. Cardiac enlargement determined by percussion and the position of the apical impulse was found in 28 percent of 200 cases; however, Colonel Wood questioned whether X-ray findings would corroborate such a high percentage. In the same 200 cases, 24 percent had a gallop rhythm and 33 percent a soft first heart sound. Electrocardiographic tracings were taken on 42 patients in the 2d and 3d week of the disease. In 30 of this group, the tracing was taken because a cardiac complication was suspected; 8 showed P-R interval prolongation of 0.22 seconds or more, 18 showed minor and 3 showed definite abnormalities of the Q.R.S. and/or T segments. In the remaining 12 cases, the tracings were taken merely to determine the incidence in unselected cases of scrub typhus. Although the series was too small for conclusions, 3 cases showed P-R intervals prolonged to 0.22 seconds or longer, and 2 showed marked RST segment deflections and/or T wave inversion.

Colonel Wood concluded his report on the cardiovascular findings, as follows:

These cardiac phenomena rarely occur in the first week. They appear from the 7th to the 16th day. We do not as yet have the figures for the duration of enlargement, gallop, etc. Moreover the correlation between pathologic and clinical findings is not yet available. The patients with the largest hearts did not all die, by any means. In fact most of them recovered. As they got well, their hearts returned to normal size. None of them showed congestive failure. A few patients who died showed mild to moderate degrees of right sided cardiac dilatation at autopsy. Pericardial effusion was not seen.

* * * * *

e. Conclusion.—Although our data are as yet incomplete, it is our impression that these cardiac signs all disappear during convalescence, and that the "effort syndrome" picture seen in some convalescent typhus patients is not due to heart disease *per se*.

Ocular changes.—Maj. Harold G. Scheie, MC, studied the eyes of the patients at the 20th General Hospital at weekly intervals during the course of the disease, consolidating the results of his studies in a brief but comprehensive report. He stated as follows:

* * * The first and most uniform change found in the fundi of the patients with scrub typhus was progressive venous engorgement with onset late in the first or during the second week, continuing until the veins are two to two and one half times the diameter of the arteries. Accompanying this change the veins become more tortuous, irregular and sausage like in caliber, most marked near the disc. The outlines of the venous walls become indistinct while the arteries remain well defined. Apparent compression of the veins occurs at the arteriovenous crossings where the veins frequently appear interrupted by the arteries, which at these points have a diffuse veil along their walls. As these latter changes progress, the disc and retina become edematous and the posterior pole of the eye appears somewhat veiled particularly in the region of the disc. The disc and surrounding retina appear pale and more opaque than normal. In a few cases retinal hemorrhages and cotton wool exudates occur when the retinal changes are at their height.

Conjunctival injection occurred in 38 percent; subconjunctival hemorrhages in 6.5 percent. Retinopathy, when present, was of diagnostic significance inasmuch as lesions of this type were not seen in other febrile diseases. Edema of the disc and retina was noted in 36 percent, was always bilateral, and was preceded by engorgement of the veins. Retinal hemorrhages occurred in 6.6 percent. They were usually superficial and flame shaped but occasionally deep and punctate. Retinal exudates, usually of the cotton-wool type, occurred in 4.9 percent. Major Scheie failed to find evidence in the retinal vessels of the perivasculitis mentioned in TB MED 31; he felt that the changes were rather those of a true vasculitis.

Neurological manifestations.—Involvement of the central nervous system was evident in practically all cases. A nerve type of deafness was seen in the majority of patients during the 2d or 3d week. Tinnitus was usually an accompaniment. Peripheral nerve symptomatology, such as paresthesias, numbness, and weakness, was seen in a few. These phenomena generally disappeared with defervescence. Meningoencephalitis was evident at post mortem examination in all fatal cases. Clinically, involvement of the central nervous system was reflected by apathy and drowsiness in the early stages of the illness and, in the 2d and 3d week, by confusion, delirium, restlessness, convulsions, and coma. Captains Sayen and Pond and Colonels Forrester and Wood described the restlessness in their 616 cases as follows:

Twenty-six patients developed a peculiar, persistent restlessness. Such individuals would not lie quietly, but constantly thrashed about, sat up, or tried to get out of bed. They would not tolerate an oxygen mask, or an intravenous infusion. They required constant nursing supervision and sedation. They were all gravely ill and wore themselves out at a time when their physical reserves were precariously low.

Malignant restlessness or convulsions were among the most ominous developments, and coma was usually followed by exitus. In 200 cases at the 20th

General Hospital, only 12 patients had convulsions; coma occurred in 14 cases.

Hemorrhagic phenomena.—To a variable extent, hemorrhagic phenomena were seen at the different hospitals. In the theater ETMD for June 1945, the 73d Evacuation Hospital reported that at that hospital relatively few patients showed a bleeding tendency except as a terminal event; whereas, in the theater ETMD for April 1945, Capt. (later Maj.) Horace H. Hodges, MC, at the 20th General Hospital, found the reverse to be true, as follows:

It was concluded that, in a considerable proportion of patients with scrub typhus, there is an abnormality of the clotting mechanism. A lowered prothrombin content seems to be frequently associated with prolonged clotting. An actual purpura, with platelet deficiency, was encountered twice with long clotting and low prothrombin. The significance or cause of this is unknown. In itself, prothrombin in the range of 50 percent normal is not enough to prolong clotting. Other unknown factors must be operating.

Also in the June ETMD, the 14th Evacuation Hospital in reporting on a gross pathologic study revealed the following incidence of vascular or hemorrhagic manifestations:

1. Of 16 autopsies performed on U.S. soldiers, there was 1 case of acute infarction of liver, 2 cases of acute infarction of spleen, 1 case of acute military myocardial infarction with perirenal hemorrhage, 2 cases of adrenal medullary hemorrhage, 1 case of massive hemorrhage into psoas muscles and retroperitoneal tissue, 1 case of massive hemorrhage into small and large intestines, and 1 case of acute infarction of kidney.

2. Of 7 autopsies performed on Chinese soldiers, there were 3 cases of massive hemorrhage into psoas muscles and retroperitoneal tissues; 1 case of massive hemorrhage from nasopharynx; 1 case of acute infarction of kidney; and 1 case of massive aspiration of blood into lungs, source undetermined.

These were all post mortem findings. No mention was made in the report of the incidence of hemorrhagic phenomena in nonfatal cases.

Treatment

Therapy was primarily supportive and symptomatic. Strict bed rest was essential, and it was generally agreed that nursing care was of the utmost importance. At the 20th General Hospital, it was the consensus that the care a patient received in the first week of the disease might be decisive in determining ultimate survival.

Sufficient fluids to insure an adequate intake were essential, particularly during the monsoon season; at times it was necessary to administer fluids parenterally. In the theater ETMD for May 1945, medical staffs of the 20th General and the 48th and the 73d Evacuation Hospitals agreed that slow and cautious administration of intravenous fluids did not constitute a serious hazard; however, the medical staff of the 14th Evacuation Hospital expressed the following opinion:

b. *Fluids*: We are strongly of the opinion that the interference with fluid balance by means of intravenous fluids in this disease is hazardous and, at best, not as beneficial as the frequent administration of fluid, even in small amounts, by mouth. An intravenous infusion,

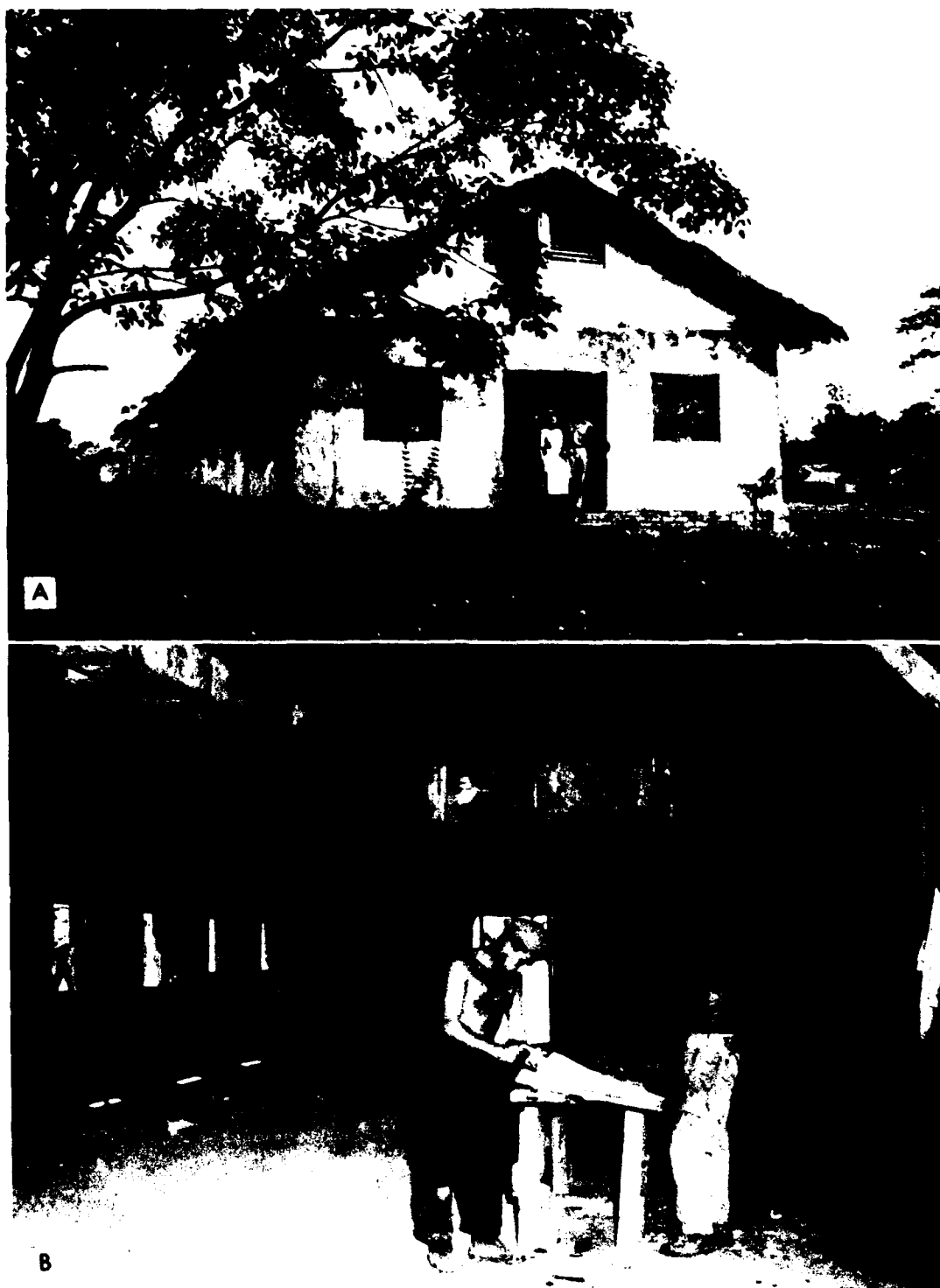


FIGURE 253. Air-conditioned typhus wards at 20th General Hospital. A. Exterior view. B. Installation of air conditioning.



FIGURE 253. Continued. C. Interior view of an air-conditioned ward.

which in other illnesses would be expected to beneficially affect dehydration, will most frequently be found to fail in this condition and at times is obviously deleterious.

Only one patient was seen at the 20th General Hospital in whom the slow administration of fluids intravenously produced an adverse effect.

Blood transfusions were routine for patients with anemia and hypoproteinemia. Sedation, in adequate doses, was essential for restless patients; narcotics, rectal paraldehyde, and intravenous barbiturates were used. Oxygen was administered for cyanosis. Sulfonamides and penicillin were employed by all installations. It was agreed by all that these drugs had no effect on the typhus itself and that they were of questionable value in complications such as pneumonia.

The installation of air conditioning (fig. 253) in the typhus wards of the 20th General Hospital in June 1944 was followed by a prompt drop in mortality from 17 percent to 3 percent. However, although it was reasonable to believe that air conditioning made the patient feel more comfortable and generally improved his subjective feelings, there was no proof that the drop in death rate was a consequence of the air conditioning, in view of the additional fact that the patients admitted to the hospital at that time were in better physical condition than those who came in during the early weeks of the Myitkyina campaign.

In the treatment of the complications, vitamins E and K were used to control bleeding tendencies. Digitalis was not used in the cardiovascular complications at the 20th General Hospital because of the impression of the staff that the drug was not helpful in acute febrile diseases. On the other hand, the 14th Evacuation Hospital staff made the following statement: "Digitalis has proven a most valuable drug when used in cases with any manifestations of cardiovascular impairment or dysfunction, as well as in cases with obvious cardiac failure." The 48th Evacuation Hospital was also of the opinion that digitalis was beneficial.

Prolonged convalescent care was the rule. The majority of patients with scrub typhus were returned to duty within a period of from 3 to 4 months. A complete program for reconditioning of such patients, based on the program in use at the 20th General Hospital, was published in Circular No. 11, Office of the Surgeon, Headquarters, USAFIBT, 23 December 1944, subject: Scrub Typhus Reconditioning. The convalescent period required from 3 to 4 months for patients who were to return to combat duty. Because of the severity of the illness and the prolonged convalescence, there was a tendency for patients to develop an effort syndrome if the physical reconditioning was pushed too hard. Patients who had been severely ill, usually with a complication such as pneumonia, myocarditis, meningoencephalitis, or severe hemorrhage, were evacuated to the Zone of Interior.

Cutaneous Diphtheria

Chronic ulcerative skin lesions originating in unhealed, infected abrasions or bites are common during the monsoon season in the Assam-Burma jungle. They are generally called tropical ulcers or, particularly in this region, Naga sores (fig. 254). Consequently, when in June and July 1944, U.S. soldiers in the neighborhood of Myitkyina developed sluggish, necrotic ulcers on their extremities, the lesions were considered to be a form of tropical ulcer. Under the pressure of combat conditions, many men continued to remain on duty and received little or no treatment. Soldiers given local treatment usually showed some degree of healing of the ulcers; their return to duty, however, resulted in almost immediate relapse.

The more severe and persistent cases were evacuated back to general hospitals. When some of the patients on the dermatology service at the 20th General Hospital developed neuritis and cardiac symptoms in August and early September 1944, Colonel Wood, chief of the medical service, and Maj. (later Lt. Col.) Clarence S. Livingood, MC, of the dermatology service, both submitted reports on 15 September 1944 to the commanding officer of the hospital, suggesting that these skin ulcers were cutaneous diphtheria.

As a result of these reports, Maj. (later Lt. Col.) John L. Arbogast, MC, of the 9th Medical Laboratory, made an epidemiologic and bacteriologic survey of the Myitkyina area, sending in a preliminary report to the commanding officer of the laboratory on 16 October 1944 and a more complete report on



FIGURE 251. Typical tropical ulcer or Naga sores.

16 November 1944. The survey showed that the units involved in the outbreak were exposed to living conditions that were severe even for combat. In addition to the hardships of foxhole fighting, these men suffered from numerous minor abrasions from the thick jungle undergrowth, from leech and insect bites, and from the intense heat and humidity of the Burma monsoon season. Poor personal hygiene was unavoidable; bathing facilities were rarely available. Clothing and equipment were always damp, and, since much of the fighting took place through rice fields, it was impossible for the men to keep their feet dry.

The source of the infecting micro-organism was a matter of great interest and was intensively studied. The 9th Medical Laboratory studies included cultures from the rice paddies; these were uniformly negative. Rare cases of faucial diphtheria were reported among the troops from time to time, but 129 nose and throat cultures from a group of the 475th Infantry showed only one positive for *Corynebacterium diphtheriae*; it proved to be avirulent. No definite relationship could be traced between faucial diphtheria and cutaneous diphtheria. It is of interest that the Joint Intelligence Collecting Agency, in its report No. 2078, dated 14 November 1944, observed that during the same months the British hospitals in India were also seeing a number of cases of cutaneous diphtheria.

Cutaneous diphtheria was not reported until September when the diagnosis was first established at the 20th General Hospital in a group of patients with myocardial and neuritic complications. Earlier cases undoubtedly had occurred. One soldier, admitted to another hospital because of ulcers of the leg, developed myocarditis and died in congestive heart failure 12 days after admission. No electrocardiograms or cultures were made. At post

mortem examination, inflammatory changes consistent with diphtheritic myocarditis were evident.

Once cutaneous diphtheria became established as a disease entity, patients were diagnosed early and hospitalized. A more complete report on 9 October 1944 from Major Livingood of the 20th General Hospital to his commanding officer followed the original brief reports, and in October the 69th General Hospital reported on 30 cases. Additional reports were submitted in 1945. In the theater ETMD for April 1945, Capt. (later Maj.) Harvey Blank, MC, of the 69th General Hospital, reported on another 40 cases from that hospital, and Maj. Herbert S. Gaskill, MC, of the 20th General Hospital, reported on neurological complications. In the May 1945 ETMD, Captain Blank reported on 3 cases from the 69th General Hospital enlisted detachment. Major Kay of the 20th General Hospital submitted a report on the cardiac complications.

Clinical manifestations

The clinical findings have been described in many textbooks and in TB MED's on the subject. It was apparent from the histories of these cases that, like tropical ulcers, the diphtheritic ulcers arose from minor cuts, abrasions, and mosquito bites which failed to heal. Multiple ulcers were the rule, in most cases located on the lower extremities, usually below the knees. The hands and the forearms were the next most frequent sites; other parts of the body, such as the scalp, trunk, axillae, and perianal regions, were less commonly involved.

Major Livingood, in his preliminary report of 15 September 1944, stressed the following three diagnostic features:

1. An ulcer with a black adherent crust; this was the most important clinical finding.
2. A greyish, yellowish, or brownish-grey membrane in a superficial or deep ulcer.
3. An ulcer surrounded by an inflammatory reaction out of proportion to that usually seen in eczematous ulcers of a similar size.

Captain Blank, in his analysis of 40 cases at the 69th General Hospital, described the lesions as punched-out ulcers with a black or brownish-black eschar or, in the absence of an eschar, a greyish membrane. The scars were "deep, very destructive, and atrophic, with a violaceous tan color." Darkening of the skin around the ulcers was described by all observers, and anesthesia of the skin immediately surrounding the ulcer was common. Pain was not a prominent feature except when an attempt was made to remove the eschar or membrane.

Under local treatment, the ulcers healed slowly from the periphery towards the center. The scar did not contract when healing was complete, and the final scar was an atrophic circular spot the size of the original ulcer.

The healed ulcers frequently broke down. The process was usually preceded by the formation of a bulla or vesicle in the center of the healed scar.

When this ruptured, the rest of the ulcer soon broke down completely. Healing generally took place fairly rapidly after such a breakdown, but because of the frequency of such occurrences hospitalization was usually prolonged. In a final report on the cases seen at the 20th General Hospital, Capt. Daniel J. Perry, MC, of the dermatology and syphilology section, wrote to the consultant in dermatology in the Surgeon General's Office, as follows:

This tendency of diphtheritic ulcers to break down is perhaps explained by the microscopic picture which shows massive fibrous tissue formation enclosing small vessels and capillaries surrounded by a round cell exudate. The process extends peripherally into the normal skin beyond the ulcer and also downward into the subcutaneous fat. The histologic picture suggests that a local toxic agent has produced severe cutaneous and subcutaneous changes. The destruction of nerve endings probably accounts for anesthesia present in the scars of cutaneous diphtheritic lesions.

Cultures from the recurrent ulcers did not show virulent *C. diphtheriae*.

Complications

The 7 cases with cardiac complications (in the 141 cases reported on by Major Kay of the 20th General Hospital) constituted only 5 percent of the total group. Only 4 of the 7 cases had definite myocarditis; the others were listed as probable. One of the four died. There was no "typical picture" of cardiovascular complications. The one fairly consistent finding was an inversion of the T wave in lead CR₃; this was present in all cases of myocarditis except the one with fatal termination. Interestingly, no instances of intraventricular conduction defects were noted in the cutaneous diphtheria group, although two patients with faucial diphtheria who developed myocarditis showed this type of lesion. Cardiac manifestations usually developed between the 3d and the 7th weeks. At the 69th General Hospital, only two cases with cardiac involvement were seen.

Neurological complications were much more common. At the 20th General Hospital, 43.5 percent of the cases showed neuritic involvement. At the 69th General Hospital, in a group of 40 cases, 48 percent developed neuritis. The important neurological complications seen at the 20th General Hospital were summarized in the theater ETMD, dated 10 May 1945. These complications were discussed, in general, as follows:

Neuritis appeared in the average case 70 days after the onset of cutaneous diphtheria (the extremes were from 23 to 158 days). The clinical course of the neuritis proceeded in regular sequence through certain definite steps, which were in some cases partially superimposed and in others quite separate. The steps in order of their appearance were (1) cranial-nerve involvement, (2) peripheral-nerve involvement (sensory), and (3) peripheral-nerve involvement (motor). In the majority of cases, cranial-nerve involvement failed to appear, but the stated sequence in peripheral-nerve involvement was maintained. In many cases, the peripheral motor symptoms did not occur, the patient showing only sensory phenomena.

The manifestations of these three types were as follows:

1. *Cranial nerve involvement (duration from 10 to 30 days).*—The most common symptom was blurred vision due to loss of accommodation. Other less frequent signs were weakness of the pharynx and palate, loss of taste, and numbness of the lips and tongue.

2. *Peripheral nerve involvement, sensory (duration from 28 to 56 days).*—This always

began with paresthesia (numbness and tingling of hands or feet or both). Later, there was a diminution in perception of light touch and pain.

3. *Peripheral nerve involvement, motor (duration from 60 to 90 days).*—This always began with the subjective symptom of weakness of arms or legs, accompanied by diminished or lost tendon reflexes. In severe cases, atrophy occurred. A very few individuals showed posterior column signs, loss of position and vibration plus mild ataxia.

Cranial nerve involvement was usually followed by moderate or very severe neuritis. Consequently, it seemed to be a prognostic indication. The duration of neuritis was directly related to its severity. The average case lasted 100 days (extremes from 21 to 184 days). The site of the cutaneous lesion bore no relation to the location of the neurological involvement. Severity of cutaneous lesions could not be correlated with severity of neuritis, but it did correlate with frequency of neuritis. The spinal fluid proteins were found to be elevated in nearly every case of neuritis. In general, the elevation was proportional to the severity of the neuritis and persisted until the neurological phenomena disappeared. Complete recovery from neuritis occurred eventually, even in the most severe cases.

Treatment

Antitoxin, in doses of from 20,000 to 40,000 units intramuscularly as early in the course of the disease as possible, was the most important measure. Injection of the antitoxin in the neighborhood of the lesion had no apparent advantage over intramuscular injection into the buttocks.

Nonspecific therapy consisted of pressure dressings after cleansing with various antiseptics, such as penicillin solutions, potassium permanganate, mercury bichloride, and sulfonamides. Cod liver oil ointment under a firm dressing was used effectively in several instances, and zinc peroxide also was used with beneficial results. Parenteral penicillin was ineffective.

The ulcers of twelve cases at the 20th General Hospital were treated surgically, and reported on by Maj. (later Lt. Col.) Henry P. Royster, MC. It was the opinion of Major Royster that more frequent use of surgery would have resulted in a larger proportion of men returned to duty and would have reduced the length of hospitalization. He concluded that surgery should be considered in every case when the lesion fails to heal after from 60 to 70 days; excision of the ulcer during the acute stage is contraindicated. Excision of the ulcer and a small cuff of skin followed by application of a split skin graft apparently yielded the best results. The nutritional state of the patient seemed to exert a profound influence on the healing process. In a patient with anemia and hypoproteinemia associated with hookworm infestation, the wound failed to heal until these factors were taken into account and corrected. Adequate feeding of protein and transfusion of blood and plasma were necessary in some cases. No manifestations of vitamin C deficiency were apparent.

Bacteriology

The first intensive bacteriologic studies were begun by the 9th Medical Laboratory in October 1944 and reported on to the commanding officer of the laboratory by 1st Lt. (later Capt.) Charles Cox, SnC, on 14 November 1944. In addition to cultures from the ulcers, the study also included cultures from the soldiers of one of the organizations located near Myitkyina. Nose and throat cultures from the 475th Infantry, one of the units most affected, showed

128 negative cultures and 1 morphologically positive, but avirulent, culture. Cultures from the rice paddies, considered a possible source of infection, were uniformly negative.

Of 53 cultures taken from leg ulcers, 10 showed morphologic characteristics typical of *C. diphtheriae*—9 were avirulent, and 1 was positive to virulence test. Later cases showed a higher percentage of virulent cultures. Of the 10 positives, the single virulent culture came from a patient whose ulcers were only of 6 days' duration and who had a Schick positive reaction, whereas in the other 9 patients the lesions were from 23 to 110 days old and the Schick reactions were negative.

Schick negativity, however, did not mean protection against the disease. In Major Livingood's report of 9 October 1944, one patient, a medical officer treated at the 20th General Hospital, had definite knowledge of having a negative Schick reaction for 6 years. This individual not only developed clinical cutaneous diphtheria but also neurological complications. A soldier in the 69th General Hospital enlisted detachment, reported on by Captain Blank, developed typical clinical cutaneous diphtheria 3 weeks after a negative Schick test had been found in the course of a routine survey of his unit.⁹ Although no cultures were taken in this case, it resembled in every respect the other cases of cutaneous diphtheria. A second case at the 69th General Hospital developed typical skin diphtheria with a positive virulent culture for *C. diphtheriae* in March 1945; this patient also had had a Schick negative reaction in October 1944 when the unit was surveyed.

Comment

Cutaneous diphtheria proved serious in many respects. Two deaths were directly attributable to it. A tremendous number of man-days were lost to the Army because of the slow healing of the ulcers and the high incidence of neurologic complications requiring prolonged hospitalization and convalescence. The total number of hospital days of 140 patients at the 20th General Hospital was 18,783. Many of the patients lost a total of 5 months from duty, and several lost as much as 7 months. The average healing time of the ulcers for the whole group at the 20th General Hospital was approximately 42 days, with extremes of from 12 to 128 days. Sixty percent of the patients at the 20th General Hospital returned to full duty after an average period of hospitalization of 85 days, and 18 percent returned to limited type of duty.

The most important lesson learned from this epidemic was that these patients had to be recognized in the early stages by the forward medical units and evacuated immediately. The earlier specific treatment was instituted, the shorter was the stay in the hospital and the lower the incidence of complications.

⁹ The question of the potency of the testing materials may be raised in these last two cases, or for that matter in almost any case tested with Schick material and found negative, unless it is known whether others tested from the same vial were Schick positive. The diphtheria toxin is heat labile, and, with the high temperatures reached in India, it is conceivable that the testing material may have been rendered useless.

Fever of Undetermined Origin

Diagnostic problem

The medical officer arriving in India or Burma from the temperate zone of the United States is startled by the omnipresent diagnostic problem of the patient who presents himself at dispensary or hospital solely because of fever with attendant malaise, headache, and generalized pains and aches. A careful physical examination soon after the onset fails to reveal any diagnostic findings. The medical officer soon learns that repeated careful physical examinations and laboratory studies during the succeeding days may reveal findings that will declare the diagnosis of malaria, dengue, sandfly fever, infectious hepatitis, kala-azar, smallpox, typhoid fever, poliomyelitis, typhus fever (louseborne, tickborne, fleaborne, or miteborne), amebic hepatitis, or one of the dysenteries. Then, too, many patients will reveal the presence of diseases more usual in the previous professional experience of the medical officer, such as nasopharyngitis, primary atypical pneumonia, or infectious mononucleosis. The fact that the patients were mainly a young vigorous group from which the sickly had been screened, accounted for the few instances of metabolic or degenerative diseases, such as diabetes, nephritis, tuberculosis, or chronic rheumatic heart disease.

Statistical fallacy

The incidence rate per 1,000 per annum of patients with undiagnosed fevers, or FUO (fever of undetermined origin), in the India-Burma theater was not equaled in any other theater of operations. It is unfortunate that the term "fever of unknown origin" as used in the statistical reports carries the connotation that such patients manifested fever that could not be diagnosed by the medical officers. In point of fact, this applied as a rule only when the patient first presented himself at the dispensary or other local installation soon after the onset when there were no characteristic diagnostic findings. These installations were not always equipped with the laboratory facilities to make the requisite diagnostic studies. The majority of such patients, when observed during their clinical course, revealed some definite disease or syndrome entity and were appropriately reported. Such an individual appeared twice in the statistical reports, initially under FUO and, later, under dengue, sandfly fever, malaria, or whatever diagnosis was finally made. The extent to which the official FUO rate of this theater reflected the initial perplexity of the medical officer rather than the final diagnosis is not ascertainable. Chart 12 shows the theater monthly incidence rate from January 1943 through 1 July 1945.

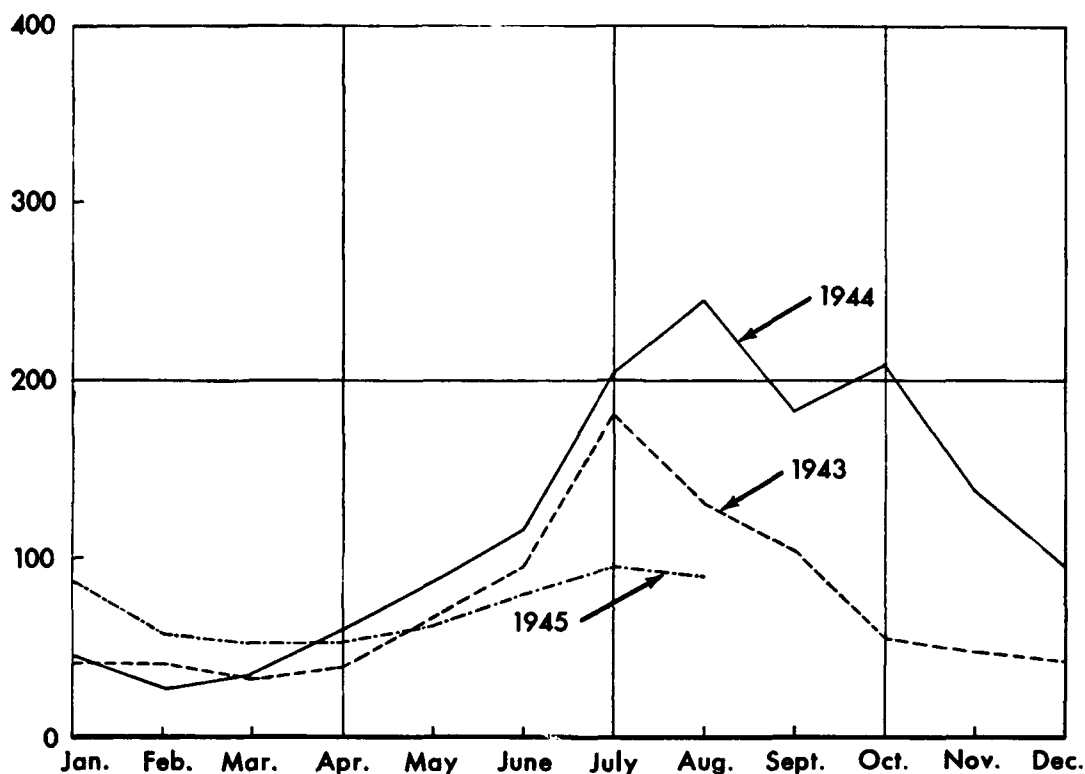
Dengue and sandfly fever group. Many patients exhibited a febrile course of from 1 to 10 days with clinical characteristics consistent with either sandfly fever or dengue. Certain patients, to be sure, showed a rash, blood findings, or temperature curve wholly characteristic of the one or the other. For the most part, however, clinical observation permitted no such differentiation. The fact that sandflies are prevalent in Karachi, India, and the *Aedes*

CHART 12.—*Monthly incidence rates, undiagnosed fever, U.S. Army troops in India-Burma theater, January 1943–August 1945*¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions plus secondary diagnosis cases per annum per 1,000 average strength]

Rate



¹ Includes cases admitted in China prior to November 1944.

aegypti in Calcutta, India, led to diagnoses of sandfly fever in the former and dengue in the latter on epidemiologic grounds, although the clinical findings might be identical. Elsewhere in Burma and India, knowledge of insect vectors is rather incomplete.

Throughout the India-Burma theater generally, the problem of diagnosis of these two diseases was confused by several factors. There is no conclusive evidence that *Phlebotomus papatasi* is the only competent vector of sandfly or that *A. aegypti* is the only insect that can transmit dengue in India or Burma. Moreover, no accurate entomologic surveys of India or Burma had come to the attention of the U.S. Army Medical Department. The medical officer was caught in a further dilemma. Only the following three official diagnoses were permissible under the reporting procedures in effect: Dengue, sandfly fever, or fever of undetermined origin. Unable to make a definite diagnosis of either of the first two, he retreated to the comparative safety of the third classification. This problem of diagnoses was not peculiar to the Medical Department of the U.S. Army stationed in this theater. Outbreaks of febrile

illness of short duration with practically no mortality are rather extensively referred to in the Indian and British medical literature by such vague terms as "Madras fever," "Bombay fever," or "Assam fever."

It was not unusual at the time of visit of the medical consultant to encounter groups of patients from a particular unit with surprisingly uniform characteristics such as fever lasting from 5 to 6 days, severe moderate prostration, pains and aches in the muscles, photophobia, headache, moderate lymphadenopathy but no rash, leukopenia, or secondary rise of temperature. Such groups of cases were frequently given such diagnoses as "1880th Engineer fever," "610 Ordnance Ammunition Co. fever," and "Signal Corps Construction Battalion fever." This phenomenon of a disease exhibiting striking uniformity during temporary outbreaks is similar to that witnessed in many other conditions. Even the common cold at certain times may affect almost all victims with sinusitis, or gastrointestinal symptoms may assume striking prominence.

On occasion, this predominance of a single feature of the illness was perplexing. At several installations in this theater during the spring months of 1945, interesting groups of cases were observed with symptoms and signs consistent with either dengue or sandfly fever but, in addition, striking evidence of meningeal inflammation. From the 18th General Hospital, Myitkyina, Burma, Capt. Frank W. Kibbe, MC, reported 22 cases. He summarized his observations as follows:

These 22 patients were admitted to the 18th General Hospital during the month of June 1945. It is noteworthy that the patients are not all from a single group or outfit, but that four of the patients are from one group, and that three others not only came from the same outfit, but lived in the same tent. Their fourth tentmate was not admitted to the hospital, but had mild symptoms for one day at the company. Questioning of patients in an effort to discover a mode of infection common to all has thus far proved unsuccessful.

The patients were admitted to the hospital with a variety of symptoms, the most constant of which was severe frontal headache. This was nearly always accompanied by pains in the eyes. Six of the twenty-two patients had definite prodromal symptoms of a mild head cold or slightly sore throat. Four others had mild diarrhea, one severe enough to simulate an acute dysentery. There was no history of bite in anyone and no local papules or wheals as described in pappataei fever. At the height of the disease, the single striking symptom was the intense frontal headache over and in the eyes. On physical examination they showed no sinus tenderness, but marked eyeball tenderness both on pressure and with motion. Every patient had small cervical nodes along the posterior chain. Only three of the group showed even moderate nuchal rigidity and in nearly half the cases it was absent altogether. All the patients had mild fever ranging from 100° to 103°. The elevation lasted from two to five days and did not recur in any instance.

Every patient had a routine examination of the hemoglobin, white blood-cell count, differential, and urine. The white counts varied from about 5,000 to 12,000 with normal differentials while other laboratory studies were negative. The spinal fluids showed varied reactions, the white cell counts ranging from 0 cells up to 490, almost all of which were lymphocytes in all cases. The protein concentration ranged from normal to 70 mgms. per 100 c.c. In three of the reported cases, only the elevated protein was present with no increase over normal of the white cell count. Up to the present time various other studies have been negative including occasional proteus and heterophile agglutinations, Kahn and spinal fluid chlorides. No late studies have been completed as the disease is not suffi-

ciently long lasting. Throat cultures, where indicated, showed no diphtheria (K-L) organisms.

Because of the suspicion of lymphocytic choriomeningitis, ten mice were given intracerebral inoculations. Our limited supply of animals did not allow us to do this procedure on all patients so characteristic ones were picked, some from the high cell count group, others from the increased protein group, etc. Three of the mice were injected with the patient's blood, (3/100ths c.c.'s I.C.) taken at the height of the illness. The other seven were all injected with spinal fluid. None of the mice showed the typical leg symptoms and convulsions of lymphocytic choriomeningitis. Two of the mice died violently (crushed by the case) on the eighth day, while all the rest survived showing no symptoms at all at any time. The two crushed mice were autopsied and showed no evidence of disease.

The majority of the patients were over their acute symptoms by the end of six days, and were discharged from the hospital by their fourth week. At the time of discharge none of the patients showed any gross abnormalities. No residua were noted at this time.

Similar cases were observed at the 234th General Hospital in Chabua, 100th Station Hospital in Delhi, and the 99th Station Hospital in Gaya. Appropriate tests of the sera in two of the cases at the 234th General Hospital were negative for lymphocytic choriomeningitis. Occurring at the time when instances of poliomyelitis and of lymphocytic choriomeningitis were encountered, these cases raised an important clinical problem. Were medical officers dealing with lymphocytic choriomeningitis, abortive poliomyelitis, or were the findings merely expressions of the inflammatory reaction of the meninges to a virus similar to or identical with that which causes dengue or sandfly fever? None of these patients gave evidence of other diseases in which meningeal irritation is recognized; namely, acute infectious mononucleosis, mumps, acute infectious hepatitis, primary atypical pneumonia, bacterial pneumonia, or influenza. It was believed that, although further virus studies would be helpful and additional complement-fixation studies for lymphocytic choriomeningitis would be desirable, the clinical evidence permitted a diagnosis of the dengue-sandfly group of fevers, probably pappataci fever. It was of considerable interest to note that in the extensive experience of the Mediterranean (formerly North African) theater, sandfly fever with a similar benign, lymphocytic meningitis was observed.¹⁰ Napier, likewise, states that sandfly fever may simulate benign lymphocytic meningitis.¹¹

Hookworm Infestation

Although hookworm infestation was prevalent in the native population of India and Burma, it was not a problem of great moment in U.S. troops except in certain areas under particular circumstances. In a survey on the incidence of intestinal parasitism in Assam, by Capt. (later Maj.) Franklin Carter, MC, of the 9th Medical Laboratory, single stool examinations were done in 6,422 U.S. soldiers; only 13 were positive for ancylostomiasis. Similarly, only 9 hookworm infestations were found in a survey by Captain Ehrlich

¹⁰ Circular Letter No. 40, Office of the Surgeon, Headquarters, North African Theater of Operations, 29 July 1944, subject: Sandfly Fever (Pappataci Fever).

¹¹ Napier, L. E.: *The Principles and Practice of Tropical Medicine*. London: W. Thacker & Co., 1943, p. 318.

of 506 personnel of the medical detachment of the 20th General Hospital. This is in contrast with the finding of 280 positive stools from 1,000 Indian civilians. These studies, although not highly accurate because of the inevitable handicaps incident to wartime conditions, nevertheless, provided a general estimate of the incidence of infestation.

The extent to which hookworm disease was responsible for hospitalization is not known since report of the disease was not required on Form 82 ab, Statistical Health Report. The experience of the medical consultant on his visits to the various installations was in general accord with the low incidence of infestation found in the surveys just mentioned, except, however, that the disease was far more common than had been suspected in the patients hospitalized in Ledo and along the Stilwell Road. These patients had worked in maintenance and construction units, had bathed in streams, occasionally had walked barefooted along river banks or in fields, and had had ample opportunity for infection. Similarly, early in the war, combat units were not infrequently affected. It is probable that almost all of these patients contracted hookworm infestation in this theater. Only about 20 percent had lived in the hookworm belt in the United States, and *Ancylostoma duodenale*, a species encountered in the United States, was recovered in a high percentage.

The experience with hookworm infestation in combat troops was excellently described by Captain Rogers and Lt. Col. Gustave J. Dammin, MC, in their report based on 50 consecutive cases admitted or transferred to the gastrointestinal and dysentery wards of the 20th General Hospital. Several hundred additional cases both with and without symptoms were seen on the general medical wards during the same period of time. The authors, stressing particularly the syndrome of acute onset of moderately severe gastrointestinal symptoms associated with eosinophilic leukocytosis, and stated:

It differs from the traditional clinical picture of hookworm disease chiefly in the abruptness of onset, the prominence of acute and sometimes disabling digestive symptoms and the lack of anemia * * *. In many, a sudden onset of nausea, vomiting, abdominal pain and diarrhea occurred. In others, a more gradual onset of cramping and burning abdominal pains after meals was the initial manifestation. The nausea, vomiting and diarrhea tended to subside and to become intermittent.

These authors described pain as the most prominent and persistent of the gastrointestinal symptoms. It was usually epigastric but sometimes periumbilical, and it tended to be diffuse. In many patients, the pain appeared immediately after meals. The frequency of the various symptoms of the hookworm infestation found in the patients in this study is shown in table 8.

Physical findings were not striking except for the almost universal loss of from 10 to 40 lbs. in weight. The definite diagnosis of hookworm infestation depended on the demonstration of the ova in the stools. In accord with extensive experience elsewhere, Captain Rogers and Colonel Dammin found that direct examination of the stools, even when repeated several times, was not a satisfactory procedure. Repeated examinations by the direct method established the diagnosis in only approximately 60 percent of the patients;

only 20 percent had positive stools on the initial examination. On the other hand, when the zinc sulfate flotation method was utilized, hookworm ova were consistently found after not more than 3 stool examinations, and in 85 percent of the patients they were demonstrated on the initial examination. In accord with general experience, one of the most striking features was the prevalence of eosinophilia.

TABLE 8.—Symptoms observed among consecutive cases of hookworm infestation at the 20th General Hospital, U.S. Army troops, 1945

Symptoms	Total cases ¹	Number with symptoms	Percent
History of ground itch.....	42	12	29
Respiratory symptoms.....	41	29	71
Abdominal pain.....	49	42	86
Vomiting.....	46	27	59
Diarrhea.....	48	25	52
Abdominal tenderness.....	48	32	67
Weight loss.....	36	29	81

¹ Number of cases in which a reliable history could be obtained.

Source: Blumgart, Herrman L., and Pike, George M.: History of Internal Medicine in India-Burma Theater. [Official record.]

Gastrointestinal X-ray studies in these patients was the subject of a report in which the so-called cogwheel pattern was described. This abnormality in the pattern of the small intestine was considered a characteristic finding in many cases and was due to deep broad indentations in the column of barium made by the thickened rugal folds of the jejunum and distal duodenum.

Colonel Blumgart visited the varicous installations only late in the course of the war, at which time the clinical manifestations of hookworm infestation did not present the acute fulminating syndrome described in the report by Captain Carter of the 9th Medical Laboratory but were rather those commonly recognized as indicative of chronic infection. Malaise, anorexia, upper abdominal discomfort or pain with insidious onset and accompanied by psychoneurotic disturbances were frequent. The clinical diagnosis of hookworm disease was rendered difficult, since practically each of the symptoms of this disease was prevalent throughout the theater regardless of the presence or absence of hookworm infestation. Thus, "Ground Itch" was simulated by foot infections or dermatitis and respiratory symptoms by nasopharyngitis, while abdominal pains, vomiting, and diarrhea occurred in practically all military personnel at one time or another during their stay in India and Burma. Detection of cases, therefore, rested largely on suspecting the condition in all patients with any of these symptoms, insisting on a differential count of the leukocytes in all suspected patients, and examining the stools by con-

centration techniques. Not a few diagnostic mysteries, temporarily residing under the designation of dyspepsia or psychoneurosis, were classified by carrying out these simple measures.

Filariasis

Occasional cases of filariasis contracted elsewhere were seen in the India-Burma theater from time to time, but no outbreaks occurred in U.S. Army personnel. Nevertheless, the presence of endemic foci of infection among the congested native population in close proximity to some of the Army encampments and the prevalence of one of the chief vectors of the disease, *Culex fatigans*, raised important problems.

During May 1945, three cases of filariasis were reported from the Hastings Air Base near Calcutta. They were referred for study to the 142d General Hospital in Calcutta. Eighteen additional cases were under observation at this time at the Hastings air station.

An epidemiologic survey of the problem was made by preventive medicine personnel of the theater surgeon's office and reported in the theater ETMD for August 1945. The Hastings Air Base was adjacent to the community of Rishra, a slum district, in which there were many cases of elephantiasis. No factual data regarding the epidemiology of filariasis in this community were available. It was clear, however, that transmission of the disease occurred in this population and that living conditions and sanitation at the air base during the first few months after opening of the station were such that it would have been possible for transmission of filariasis to occur. A well-organized and vigorous mosquito-control program plus a successful sanitary cleanup program resulted in the control of the chief vector. It was believed that these measures greatly reduced or eliminated the possibility of contracting the disease at Hastings Air Base.

When seen at the 142d General Hospital, the three cases referred from the air base showed no positive evidence of filariasis. Orchitis had completely subsided, and, in the opinion of the chief of the genitourinary section, little or no residual changes were present. The chief of the surgical service, who had extensive experience in the Southwest Pacific Area in an endemic area of filariasis, was of the same opinion. The chief of the medical service, who had seen many cases of filariasis returned to the Zone of Interior, was in agreement. It was acknowledged that many infections remain asymptomatic for years, or even for their duration, and that the cases examined might have been filariasis. It was believed, therefore, that the three patients should be classified as suspects, their clinical status checked monthly, and, if further evidence of filariasis appeared, they should be returned to the Zone of Interior.

A conference was held in Calcutta attended by the Surgeon, Base 2; by representatives of the Air Forces and of the 142d General Hospital; by a member of the Preventive Medicine Section, Office of the Surgeon, Headquarters, USAFIBT, and by the consultant in medicine. This conference concerned itself mainly with the development of a common policy in respect to the dispo-

sition of patients suspected of harboring the infection. It was generally agreed that patients with a definite diagnosis of filariasis should be evacuated to the Zone of Interior. The chief differences of opinion revolved about the disposition of the filariasis suspect, in whom there was insufficient evidence to warrant a definite diagnosis but in whom, on the other hand, the possibility of harboring infection could not be confidently excluded. The various views were reduced to writing and communicated to the theater surgeon. After careful study, the theater policy was laid down in Circular No. 21, 29 July 1945, Office of the Surgeon, Headquarters, USAFIBT, on the diagnosis and disposition of cases of filariasis. It was recommended that any patient in whom the diagnosis was seriously entertained should be transferred to a general hospital and that, so far as feasible, such cases should be transferred early while still showing acute manifestations. It was further stated that:

It is imperative that a definite diagnosis of filariasis be made only when reasonable clinical evidence exists. This is particularly important because of the serious emotional impact on the individual concerned, and the adverse effect on the morale of troops in the area, as demonstrated by experience with the disease in the Pacific theater. The impossibility of making an absolute diagnosis early in the course of the disease by detection of microfilaria in the blood or by biopsy of affected regional lymph nodes makes reliance on sound, conservative clinical judgment essential. If a reasonable basis for the diagnosis is established in a general hospital by a thorough and careful review of the case, the patient is to be evacuated to the Zone of the Interior in accord with War Department policy.

The criteria which must be exercised in establishing the clinical diagnosis in the early stages of the disease are outlined in paragraphs 3 and 4, TB Med 142. In some patients the available evidence will not justify a clinical diagnosis of filariasis; on the other hand, its possible presence cannot be confidently excluded. Such suspects should be returned to their organization and the unit medical officer be informed of the status of the case so he can make periodic examinations at monthly intervals or oftener if considered necessary, for at least four months.

Particular caution must be exercised in basing the diagnosis on a single finding, particularly when such a finding frequently occurs unrelated to filariasis. A single recurrence of epididymitis or orchitis, without other evidence of filariasis and with only equivocal residual changes, is not considered to be sufficient basis for the diagnosis of filariasis. The diagnosis should, however, be suspected. In the physical examination of the scrotal contents, it should be remembered that there is a considerable range of normal variation. In order to evaluate correctly the earliest changes in the scrotal contents extensive experience in the palpation of the normal and abnormal is necessary.

If an individual is a noneffective repeatedly because of unexplained recurring inflammation of the scrotal contents which cannot be arrested or cured by appropriate medical or surgical management, he should be evacuated to the Zone of Interior because of inability to render consistent and effective service in the theater. Such cases, without any other evidence of filariasis however, should not be evacuated as filariasis, although the clinical records should indicate that such a diagnosis has been considered.

Lead Poisoning

The diversity of clinical problems encountered in the India-Burma theater is illustrated by the occurrence of lead poisoning in petrolatum pipeline companies. One of the major missions of this theater was the construction and maintenance of the pipelines to China. Jungle and mountainous terrain presented



FIGURE 255. Petroleum pumping station of 708th Engineer Petroleum Distribution Company, along Assam Trunk Highway, India.

construction difficulties such as have been rarely encountered in a project of this nature and necessitated a great number of pumping stations (fig. 255). The operation of the pipeline was begun in December 1943. The first case of suspected lead poisoning appeared in December 1944 in a patient admitted to the 20th General Hospital because of moderate anemia. A survey was then made by 1st Lt. (later Capt.) Benjamin S. Golub, MC, of all exposed personnel in the company to which this patient belonged; 16 men, or approximately 11 percent of all exposed personnel, were found to show a significant degree of basophilic stippling. These men were admitted to the hospital for further study. The majority had suffered from headaches, and all showed an abnormal degree of basophilic stippling with an increased urinary excretion of lead. Except for one patient with a red count of 4.15 million, the red blood cell count in all patients was 4.5 million or more. A field survey revealed that the pumping-station operators and maintenance crew were exposed to leaded gasoline from the following:

1. Normal leakage of gasoline from pumps into drip pans. Men constantly watched gauges on pumps and were continually exposed to fumes.
2. Water laden with fumes drawn off from storage tanks into adjacent ditches for evaporation.
3. Frequent failure to wash hands before eating.
4. Pumping-unit exhaust fumes.
5. Frequent washing of hands with gasoline.
6. Pumping units washed with gasoline every 12 hours.

7. Pumping units refuelled every 6 hours with gasoline carried over from storage tanks in 5 gallon cans.

8. Heavy concentration of fumes around leaks being repaired.

9. Common practice of standing in pool of gasoline either barelegged or with legs covered with grease.

The following measures were put into effect to minimize exposure:

1. Construction of an observation and control tower 50 ft. from the pumps to afford adequate supervision and minimize exposure.

2. Use of nonleaded gasoline for washing hands and for cleaning pumping units.

3. Frequent showers.

4. Change of clothing after work.

5. Periodic rotation of personnel.

6. Careful washing of hands before eating.

7. Use of high rubber boots and rubber gloves.

8. Prompt washing with soap and water after exposure of skin to liquid gasoline.

All personnel with signs of lead absorption were rotated and removed from exposure for a minimum of 6 months. Pipeline-company personnel who were exposed to gasoline were required to have blood-smear examinations every 3 months. During the entire survey, 475 exposed individuals were examined; 14 (2.9 percent) showed basophilic stippling of erythrocytes.

Skin Diseases

The incidence of diseases of the skin in the India-Burma theater, as in all tropical climates, was high. The 20th General Hospital reported that skin diseases constituted 10 percent of all dispositions from the hospital in the first year of operation and 8.6 percent in the second, approximately the same as the figures for diarrheal diseases. In addition to the patients that required hospitalization, many were seen as outpatients.

Disorders of the skin, more than any other group of diseases, reflected the effects of the climate of India and Burma on U.S. military personnel. Capt. Neal Phillips, MC, of the 18th General Hospital, writing on skin diseases in Burma, made the following observation on the climate and its relation to the various dermatologic manifestations; the remarks apply equally to India:

In Burma, as in some parts of India, there are roughly three seasons of the year, the months of May, June and October, the hot dry period; November through April, when it is fairly comfortable; and the monsoons of July, August and September, when it rains daily, usually in the morning until noon. During the latter period the sky is overcast and it is fairly cool but humid. At the time of the hottest months preceding and following the monsoons, the temperature reaches 110-120 degrees daily with correspondingly hot nights * * *.

Dermatologically, then, it is obvious that the monsoon period with its dampness encourages the growth of molds, yeasts and fungi while the hot dry season promotes disturbances in the coil glands and pilosebaceous system. * * * with the body continuously bathed in sweat, such diseases as contact dermatitis, eczematous dermatitis, miliaria,

folliculitis, infectious eczematoid dermatitis and possibly dermatophytids are the problem confronting the dermatologist during the hotter period, while during the monsoons, fungus diseases flourish.

Not only were fungus infections and eczematous and infectious eczematoid skin conditions more frequent and more severe than in the United States but there were also skin disorders peculiar to the tropics though not due to the climate per se. These included tropical ulcer, dhobie-mark dermatitis, and sensitivity to exotic plants. Atypical lichen planus also was of importance in this theater and was studied extensively, particularly at the 20th General Hospital.

Prickly heat.—In India, prickly heat, also known as miliaria, miliaria rubra, and sudamina, was undoubtedly the most prevalent skin disorder, and it affected the vast majority of U.S. Army personnel. Discomfort and interference with sleep frequently lowered efficiency in military personnel. Although rarely disabling, extensive cases occasionally became secondarily infected and required hospitalization. The characteristic features of small red papules or vesicles, which appeared principally on the trunk and upper extremities and were associated with intense itching, presented no diagnostic difficulties. A powder containing sulfur, boric acid, starch, and zinc oxide was the most commonly used therapeutic agent, but there were almost as many other methods of treatment as there were doctors treating patients with prickly heat. Some advised a deep tan; others advised staying out of the sun. Both tanned and untanned individuals had prickly heat. Very little effect was noticed with any of the methods recommended; when the weather cooled, the prickly heat disappeared.

Dhobie-mark dermatitis.¹²—This was one of the surprising medical experiences of U.S. troops in this theater. The dhobie, the Indian laundryman, marked clothes with the intensely irritating juice of the bichi nut.¹³ When these marks came in contact with a sensitive skin, a localized contact dermatitis resulted. When the source of irritation was removed, the dermatitis disappeared in a few days. Colonel Fitz-Hugh, Major Livingood, and Lieutenant Rogers, as well as Major Waud and Capt. Henry Fein, MC, published reports on this type of dermatitis in the *Field Medical Bulletin* for June 1943.

Tropical ulcer.—Necrotic, sluggish skin ulcers are found in most tropical countries and are known by different names in each country where they occur. In India, particularly in the Province of Assam, and in Burma, they were referred to as tropical ulcer, Naga sore, or Assam ulcer. They were commonly seen during the monsoon season and frequently found in individuals suffering from some systemic disease or chronic malnutrition. The ulcers originated in infected cuts, abrasions, or insect bites and usually developed into rapidly progressive, painful lesions with a necrotic base, undermined necrotic edges, and a blue-grey border. In time, the lesions became chronic,

¹² Not to be confused with dhobie itch, which is a fungus infection.

¹³ Much confusion exists regarding the exact identification of the nut used in the process. The term "bichi nut" seems to be the most generally employed.

pain disappeared, and progress was slower; the base of the ulcer then generally showed some granulations, and the border was raised, indurated, and red. Bacteriologic examinations showed fusiform bacilli and spirochetes.

Except among Merrill's Marauders, there were very few instances of tropical ulcer among U.S. personnel. Merrill's unit, fighting during the monsoon season under highly insanitary and exhausting conditions in the country where Naga sore was endemic, inevitably developed cases of tropical ulcer. The major part of the experience of U.S. hospitals with this disease came through care of the Chinese troops who, malnourished and insanitary, were fertile soil for this type of lesion. Several reports on treatment were published; these were largely based on the experience with Chinese troops.

Lt. Col. Clarence J. Berne, MC, of the 73d Evacuation Hospital appended a preliminary report on therapy of tropical ulcers to the annual report of the hospital for 1942. He was of the following opinion: "Treatment of tropical ulcer should consist of two phases; an initial phase during which the septic factor is eliminated, utilizing chemotherapy, if helpful, and a secondary phase initiated when the ulcer becomes free of significant infection." Skin grafting was not done in his series, which was in its initial stages at the time of the report. No definite conclusions were drawn.

In the *Field Medical Bulletin* for October 1943, Maj. (later Lt. Col.) James M. Beardsley, MC, of the 48th Evacuation Hospital reported on the treatment of 21 cases of tropical ulcer by a more radical surgical approach. This group showed large ulcers with a sloughing necrotic base. He concluded that the best treatment for such large tropical ulcers was immediate excision followed by skin grafting and that prolonged conservative therapy resulted in a loss of valuable time. Small ulcers were treated conservatively with sulfanilamide powder and pressure bandage.

Maj. (later Lt. Col.) John H. Grindlay, MC, who had been in Colonel Seagrave's unit ¹⁴ and who had had occasion to treat many tropical ulcers in the men forced out of Burma in 1942, published his experiences with this condition in the January 1944 issue of the *Field Medical Bulletin* (fig. 256). He recommended, in the early stages of the ulcer, excision of necrotic tissue and use of magnesium sulfate and glycerine dressings daily. In cases where the ulcer had progressed to deep tissue involvement, complete excision of the ulcer and all necrotic material was recommended. After the application of sulfanilamide crystals to the tissues, the cavity was packed with petrolatum-impregnated gauze and the entire limb placed in a cast. In 3 weeks, the cast was removed, revealing fresh granulation tissue. A fresh cast was applied and again removed in 3 weeks. The procedure was repeated until the crater was filled with granulating tissue, at which time pinch grafts were applied.

Contact dermatitis.—Major Livingood of the 20th General Hospital made an extensive study of a type of contact dermatitis seen in the Assam-

¹⁴ A hospital of the American Baptist Mission at Namkham, Burma, at the start of World War II; later served with the British Army in Burma and the United States, British, and Chinese Armies in India, Burma, and China. Its commander was Lt. Col. Gordon S. Seagrave, MC, who had been in Burma since 1922.



FIGURE 256. Burmese nurse bandaging infected leg of Chinese soldier.

Burma region (fig. 257). The etiologic factor was ultimately shown to be the sap of certain species of trees.¹³ This skin condition was seen chiefly in engineer and other organizations working along the Ledo Road between Ledo and Shingbuiyang. It was acquired by contact with the sap of these trees and, in unusually sensitive individuals, by contact with the leaves. It was also suspected that smoke of burning wood from these trees could produce the dermatitis.

The skin manifestations were not severe. The eruption was characterized by "finely vesicular erythematous, rather ill-defined patches with varying degrees of edema. Excoriations, crusting and oozing follows scratching and in some instances secondary pyogenic infection takes place, in which case a relatively chronic impetiginous eczema may ensue." The symptoms of itching and burning were severe and out of proportion to the extent of the other manifestations.

Major Livingood believed that the trees belonged to the Anacardiaceae family and that at least two genera were capable of producing the irritating sap. These were *Drimycarpus* and *Semecarpus*. The most characteristic feature of the sap was its change in color from milky white, yellow, or light red to black on exposure to the air.

¹³Letter, Major Clarence S. Livingood, MC, Chief, Section of Dermatology and Syphilology, 20th General Hospital to Base Surgeon, Base Section 3, 27 May 1941, subject: "Contact Dermatitis in Base Section No. 3—Tree Sap Dermatitis."



FIGURE 257. Maj. Clarence S. Livingood, MC, studying flora, near 20th General Hospital, believed to be source of contact dermatitis.

Hypohidrosis syndrome. Eighteen cases of an unusual syndrome peculiar to hot climates and not described in most textbooks were seen at the 20th General Hospital and reported by Major Livingood in the *Field Medical Bulletin* for May 1945. These cases were very similar to those reported by Wolkin, Goodman, and Kelley.¹⁶ In his report, Major Livingood quoted the clinical description of the syndrome described by these three authors. Because features described by them are so characteristic, the quotation used by Major Livingood is presented here, as follows:

In general they all presented a typical history, viz. a rather sudden onset of generalized weakness, subjective warmth and discomfort, dizziness "all-in" feeling, headache and shakiness. These symptoms occurred during exposure to sunlight, either with or without physical exertion. The onset of the symptoms was associated with or preceded by a cessation of sweating in each case. This was in turn often preceded by a distinct period of profuse outpouring of sweat from a few days up to several weeks' duration. The loss of sweating was limited uniformly to the body region below the neck in pronounced contrast to the outpouring of sweat from the face and neck. The objective findings were characterized most of all by a warm, dry skin from the neck down, whereas the face and neck showed

¹⁶ Wolkin, J., Goodman, J. L., and Kelley, W. E.: Failure of the Sweat Mechanism in the Desert. *J. A. M. A.*, 124: 478-482, 1944.

profuse droplets of sweat. The skin of the entire body below the level of the neck had the appearance of goose flesh. However, this fine papular eruption did not appear and disappear in a matter of minutes like goose flesh. The papular eruption was diffuse and uniform, each papule being about the size of a large pinhead. In cases of longer standing there was a fine, branny desquamation. As this condition improved, the fine papular eruption disappeared and the skin resumed its normal appearance.

Major Livingood's group included both white and Negro soldiers; 6 of the patients had atypical lichen planus and 3 were recovering from typhus fever when the symptoms appeared. All cases gave a history of excessive sweating and generalized pruritus prior to onset of the syndrome; most of the patients "tended towards a seborrhoeic habitus." As in the cases previously described, failure of the sweating mechanism was noted most frequently on the trunk and limbs, with a dry skin and a "fine branny desquamation" in the involved areas. The parts of the body usually not affected by the disturbance were the face, palms, soles, and axillae; those regions generally showed hyperhidrosis. Asthenia and weakness were a constant feature; hyperpyrexia did not occur.

Seven of the group improved spontaneously, and their sweating function returned to normal in from 2 weeks to 4 months. The remainder continued to show hypohidrosis, and at the time of the report 4 months had elapsed without evidence of improvement. In this respect, Major Livingood's cases differed from similar cases described by other authors who found that sweating returned to normal in practically all cases within a few weeks.¹⁷ Another point of difference was the gradual onset in Major Livingood's patients as compared with the rapid onset with evidence of heat exhaustion reported by the other authors.

Although the number of cases showing hypohidrosis was small, the syndrome was of considerable interest and of some military significance; in several instances, evacuation to the Zone of Interior was contemplated because a deficiency in normal sweating constituted a serious hazard in this theater.

Atypical lichen planus.—In a letter dated 30 October 1944 to the Surgeon, USAFCBI, The Surgeon General requested a résumé of the experience in the theater with the clinical syndrome known as atypical lichen planus (fig. 258). The letter included a brief description of the syndrome and stated that it was seen with striking frequency in the Southwest Pacific Area. A copy of the letter was forwarded to all medical installations.

As far as can be determined, the diagnosis of atypical lichen planus was not made in this theater prior to November 1944. On 15 November 1944 in a letter to the Commanding Officer, 20th General Hospital, Major Livingood, in reply to The Surgeon General's request, reported three cases and made the following statement:

About five weeks ago, I received a personal letter from a dermatologist of my acquaintance informing me that he had seen a group of cases from the Southwest Pacific Area

¹⁷ (1) See footnote 15, p. 774. (2) Allen, S. D., and O'Brien, J. P.: Tropical Androtic Asthenia: A Preliminary Report. Med. J. Australia 2: 335-336, 23 Sept. 1944.



FIGURE 258.—Atypical lichen planus of foot, U.S. Army captain, observed by Major Livingood at 20th General Hospital.

presenting signs and symptoms suggesting an atypical form of Hypertrophic Lichen Planus—he did not include a detailed description of the syndrome. At that time I reviewed all of my cases of Hypertrophic Lichen Planus as well as other chronic recurrent dermatoses and came to the conclusion that I had not seen the syndrome in this hospital. Therefore, it seemed an amazing coincidence to see three cases which probably fall into this group in the past four weeks, one of them a General Officer. We forwarded biopsy specimens to the Army Medical Museum on one case about 10/26/44 and on the other two cases a few days ago. In the clinical protocol, I referred to the fact that I thought that these patients had an atypical form of Hypertrophic Lichen Planus which had been seen in the Southwest Pacific Area and asked for information on the pathology of the lesions as it had been noted in those cases.

In his comments on the disease, Major Livingood said: “I have found no clues as to etiology except in two patients particularly there seemed to be a questionable light sensitivity factor. All three of these patients had been living under field conditions at the time of onset.”

The 234th General Hospital reported a single case that was thought to fit the description in The Surgeon General's letter.¹⁸ Although the description

¹⁸ Letter, Col. Bennett G. Owens, MC, Commanding Officer, 234th General Hospital, to Surgeon, Headquarters, Services of Supply, USAFIBT, 2 Dec. 1944, subject: Information on Occurrence of an Unusual Skin Disease.

strongly suggested atypical lichen planus, the history revealed that the disease had its onset 18 months earlier, while the patient was still in the United States. In January 1945, a communication from the 18th General Hospital reported two cases of a skin disorder considered to be atypical lichen planus.¹⁹ Both patients had been taking suppressive Atabrine; patch tests with this drug were negative. One of the two patients was found sensitive to SKAT, developing a positive patch test with this mosquito repellent but with no other.

On 23 February 1945, Major Livingood submitted a followup report on the 3 original cases and in addition reported 6 more full-blown cases of the disease; 3 others were mentioned in which the diagnosis was not definitely established. This report was very comprehensive, and the findings may be summarized as follows:

These cases were characterized by: Combination of eczematoid dermatitis, eczematous plaques, and violaceous lesions of various morphes identical with those seen in atypical lichen planus; generalized distribution with predilection for certain sites; severe pruritus; long course; marked residual changes in the skin including loss of hair and marked disturbance of sweating function.

All patients who were seen with the disease had had intimate contact with the jungle. All patients except one had been on suppressive Atabrine prior to onset. Most patients had antecedent eczematous lesions.

The probable multiple etiologic background was possibly a combination of exposure to jungle and a drug allergen—Atabrine in the majority of cases. One patient had never taken Atabrine at any time but had had arsenicals for early syphilis. Light sensitivity was a possible predisposing factor. Exacerbation was seen after the following: Atabrine therapy for malaria, sulfathiazol, typhoid vaccine, ultraviolet light, sunlight, and possibly food allergens.

It was suggested that men who work and/or live in the jungle might acquire a contact sensitization dermatitis from the sap and leaves of trees and shrubs which occur only in tropical and semitropical zones of the world and that these sensitized individuals might develop the atypical-lichen-planus syndrome when an endogenous allergen (Atabrine in most instances) is administered.

There was evidence that the patients in this series had disturbances of glucose metabolism, and of gastrointestinal and liver function, manifested by flat glucose-tolerance curves, X-ray changes in the gastrointestinal tract, and decreased liver function with Bromsulphalein excretion test.

A third report, dated 19 March 1945, by Major Livingood, brought the total number of cases seen at the 20th General Hospital to 15. In this report, he emphasized the possibility that exposure to the irritant black sap of certain tropical trees might be an etiologic factor. Major Livingood wrote:

We have not accumulated any new information. All of these new patients had been in the jungle in forward areas, and had been in contact with tree-sap and plants either directly or as the result of exposure to wood fires. Again I wish to emphasize that thus far all of our

¹⁹ Letter, Lt. Col. Alexander J. Schoffer, MC, Chief, Medical Service, 18th General Hospital, to Deputy Theater Surgeon, Headquarters, USAFIBT, 10 Jan. 1945, subject: Report of Two Cases of Atypical Hypertrophic Lichen Planus.

patients with this disease had been in contact with the jungle with exposure to potentially allergenic contact agents—tree-sap, various plants, etc. I consider this a possible important predisposing factor; also dietary deficiencies, and multiple insect bites are possible predisposing factors.

To facilitate study, it was decided to concentrate all cases of this disease in a few hospitals. The 20th General Hospital was designated as the center in the Advance Section, the 234th General Hospital in the Intermediate Section, and the 142d General Hospital in the Base Section. The 20th General Hospital prepared a form for the study of the cases, and, in July, Maj. (later Lt. Col.) James M. Flood, MC, who succeeded Major Livingood at the 20th General Hospital, submitted a report on 19 cases seen between 14 March and 1 July 1945. The report opened: "The experience in this theater leaves little doubt that atabrine is the main causative factor of atypical lichen planus as seen in this area. Whether there is an associated factor still remains a question, but it must now be assumed that atabrine is the principal etiologic agent."

This report was accompanied by a paper by Major Machella and coworkers on liver-function studies. Although the studies suggested the possibility of hepatic damage, no patients with atypical lichen planus showed any clinical evidence of liver disturbance.

The 234th General Hospital reported that 11 patients with the disease were being observed but no data were submitted in this preliminary report.²⁰

Other cutaneous eruptions.—In addition to atypical lichen planus, there were other skin eruptions that were attributed to Atabrine. Major Livingood reported a number of skin reactions seen at the 20th General Hospital. These included an extensive maculopapular eruption with a violent systemic reaction in a dental officer and a pruritic maculopapular toxic erythema in two nurses, 14 days and 4 days after the suppressive Atabrine program had been initiated. The eruption reappeared in both nurses when the drug was again administered at a later date. Two individuals developed a flareup of an old eczematoid dermatitis shortly after the Atabrine regime was instituted.

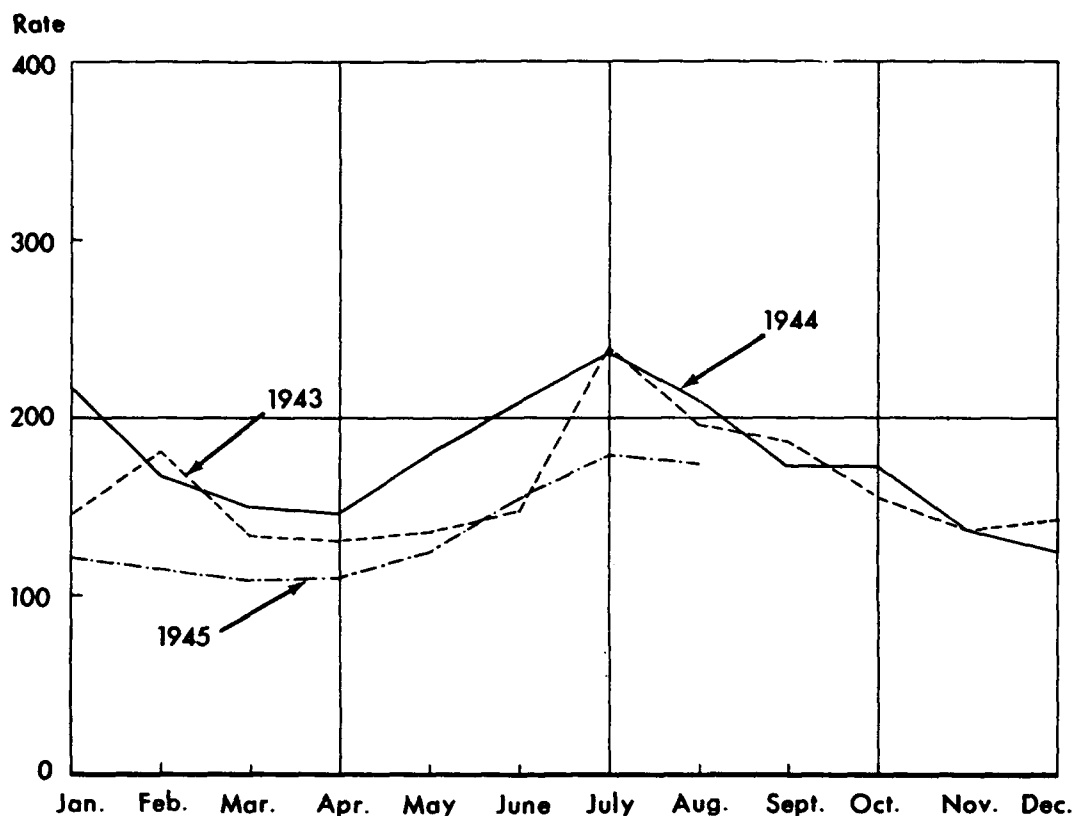
In the theater ETMD for August 1945, Captain Blank of the 69th General Hospital reported on 12 cases of an urticaria-like syndrome that he attributed to Atabrine sensitivity, and in a communication dated 23 July 1945 to the theater surgeon's office, he later reported 2 additional cases. In 12 patients, who gave no previous history of Atabrine ingestion, the eruption did not appear until 2 or 3 weeks after the institution of the suppressive Atabrine program. In 2 patients, both of whom had previously taken Atabrine, the eruption appeared within 3 days; in both, the symptoms disappeared spontaneously without discontinuance of the drug. In the other patients, the urticaria disappeared when the drug was stopped and reappeared briefly in 4 patients when Atabrine was again administered. All 14 patients eventually were able to take suppressive Atabrine treatment without difficulty. Skin tests with pure

²⁰ Letter, Capt. Joseph A. J. Farrington, Chief of Dermatology Section, 234th General Hospital, to Office of the Surgeon, Headquarters, USAFIBT, 6 July 1945, subject:

CHART 13. — *Monthly incidence rates of common respiratory disease (including influenza) in U.S. Army troops in India-Burma theater, January 1943–August 1945*¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions plus secondary diagnosis cases per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

powdered Atabrine were done in six cases, with results negative to both patch and intradermal tests.

One case of urticaria thought to be due to Atabrine was reported from the 234th General Hospital.²¹ A patch test in this case was strongly positive.

Respiratory Diseases

Upper respiratory infections

The newcomer to India, particularly if he had recently endured the snow and sleet of northern United States and had arrived in India during the sunny months of March through June, with daily temperatures of 80°–100° F., was startled by the prevalence of upper respiratory infections. This fact is reflected in the high incidence rate for this condition in the India-Burma theater (chart 13 and table 9). The actual incidence was much higher since only the

²¹ Letter, Capt. Joseph A. J. Farrington, MC, Chief of Dermatology and Syphilology Section, 234th General Hospital, to Office of the Surgeon, Headquarters, USAFIBT, subject: Suppressive Atabrine as a Possible Cause of Urticaria.

disabled were admitted to hospitals or kept in quarters. The extent to which these infections contributed to the total noneffective rate was, however, small (charts 13 and 14 and table 9).

TABLE 9.—Total cases, incidence rates, and noneffective rates of diseases of the respiratory tract in U.S. Army troops in India-Burma theater, by month and year, 1944-1945¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of cases per annum per 1,000 average strength]

Year	Common respiratory diseases and influenza			Primary atypical pneumonia			Tuberculosis, all forms		
	Total cases	Incidence rate ²	Noneffective rate ³	Total cases	Incidence rate ²	Noneffective rate ³	Total cases	Incidence rate ²	Noneffective rate ³
1944	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Number</i>	<i>Percent</i>	<i>Percent</i>
January	1,635	215	3.3	53	7.0	0.33	18	2.4	0.16
February	1,331	165	3.6	44	5.4	.27	14	1.7	.19
March	1,739	149	2.8	19	1.6	.17	20	1.7	.15
April	1,453	145	2.7	29	2.8	.22	26	2.5	.16
May	2,117	180	2.7	42	3.5	.21	19	1.6	.14
June	3,250	208	2.8	60	3.9	.18	30	1.9	.18
July	3,221	238	2.8	28	2.2	.13	26	2.0	.17
August	2,643	210	2.4	33	2.4	.09	13	.9	.11
September	3,089	172	1.9	70	3.9	.14	14	.8	.08
October	2,534	173	2.0	55	3.6	.11	18	1.2	.09
November	1,916	138	1.8	59	4.4	.25	12	.9	.12
December	2,222	125	1.7	66	3.8	.19	18	1.0	.09
1945									
January	1,855	119	1.7	68	4.6	.20	6	.4	.08
February	1,854	113	1.6	157	10.0	.28	9	.6	.03
March	2,286	108	1.4	175	8.9	.24	11	.6	.04
April	1,777	110	1.2	74	4.5	.14	26	1.6	.09
May	1,866	125	1.4	34	2.1	.07	15	.9	.09
June	3,021	155	1.9	71	3.8	.09	20	1.1	.10
July	2,760	179	2.0	70	4.9	.23	19	1.3	.16

¹ Includes cases admitted in China prior to November 1944.

² Incidence rate was calculated from the following formula:

$$\frac{C}{S} \times 1,000 \times F; C = \text{number of cases}; S = \text{strength}; \text{and } F = \text{time factor for period of time involved.}$$

³ Noneffective rate was calculated from the following formula:

$$\frac{\text{Number of patients remaining in given period}}{\text{Strength}} \times 1,000$$

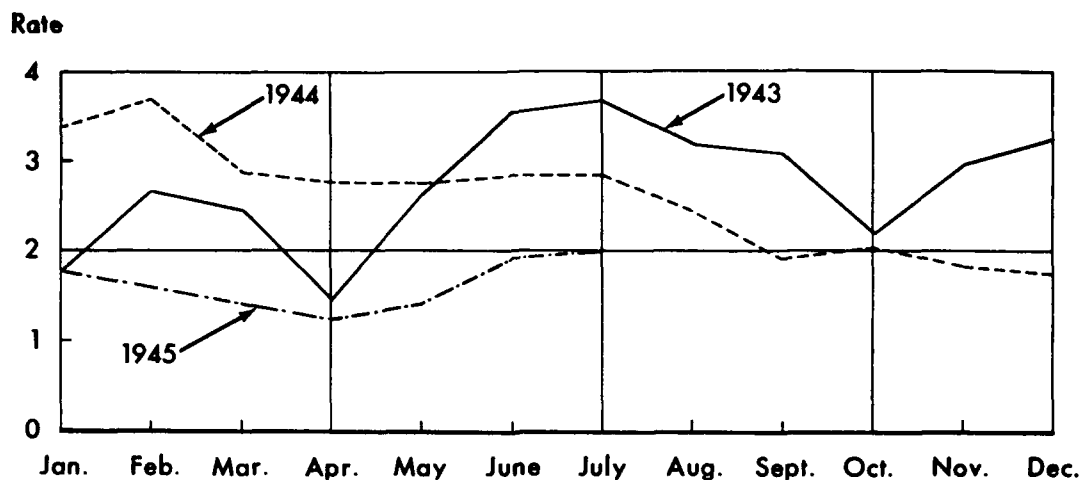
Source: Blumgart, Herrman L., and Pike, George M.: History of Internal Medicine in India-Burma Theater. [Official record.]

The clinical characteristics of nasopharyngitis in India were astonishingly similar to those seen in the United States; the complications of chronic sinusitis, middle ear infections, and the not infrequent association of tonsillitis and bronchopneumonia were apparently as frequent. Bacterial pneumonia was relatively uncommon, and but few deaths occurred.

CHART 14.—*Noneffective rates for common respiratory disease in U.S. Army troops in India-Burma theater, January 1943-July 1945*¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as average daily noneffectiveness per annum per 1,000 average strength]



¹ Includes cases admitted in China prior to November 1944.

Primary atypical pneumonia

With the onset of warm weather in this theater, the increased prevalence of respiratory infections was striking. This increased incidence was particularly noticeable in Delhi and occurred during uninterrupted sunshine and equable temperature. Actual observation of many of these cases by the consultant in medicine revealed that the clinical characteristics and X-ray and laboratory findings were in the main identical with those observed during epidemics in the United States. The increased incidence could not be ascribed to any discernible factors. Among other possibilities, ornithosis was considered since, at the time of increased prevalence of primary atypical pneumonia, swarms of migratory birds made their appearance—a single tree, for instance, often being occupied by at least several hundred parakeets. Inquiry by the consultant in medicine, however, failed to uncover any supporting evidence for this possibility. Attention was directed to this condition by the publication of notes in the *Field Medical Bulletin*, discussions with the staffs of the various hospitals, and requests for reports from the representative group of hospitals. The subject was summarized in the theater ETMD report, dated 1 June 1945.

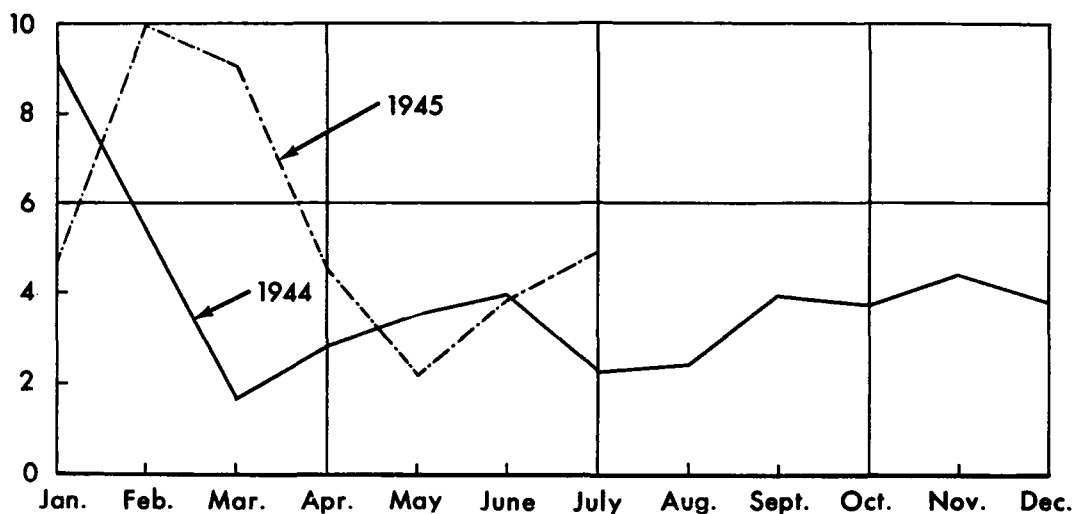
Incidence.—In general, there was an increased incidence of atypical pneumonia for the first 3 months of 1945 as compared with the corresponding period in 1944 (table 9 and chart 15). At the 100th Station Hospital, there were 96 cases in the first quarter of 1945, whereas only 14 cases were reported for the same period in 1944. The 234th General Hospital and the 73d Evacuation Hospital treated approximately twice as many cases of atypical pneumonia in 1945 as in 1944. In all instances, the hospital census was roughly the same

CHART 15.—*Monthly incidence rates for primary atypical pneumonia in U.S. Army troops in India-Burma theater, January 1944–July 1945*¹

[Preliminary data based on summaries of statistical health reports]

[Rate expressed as number of new admissions plus secondary diagnosis cases per annum per 1,000 average strength]

Rate



¹ Includes cases admitted in China prior to November 1944.

for both periods. Two reports indicated that the increase in respiratory infection was coincidental with movement of new troops into the area. The rotation of personnel, with the arrival of replacements from the United States, also began at the same time the increase in disease was noted.

Epidemiology.—Although atypical pneumonia is apparently transmitted by contact and is usually associated with an increase in upper respiratory infections, the disease was not highly communicable. Certain other factors were involved in addition to simple exposure. In this connection, the following paragraphs are quoted from an excellent comprehensive analysis of 96 cases prepared by Capt. Abraham Gootnick, MC, Chief, Medical Service, 100th Station Hospital:

In considering the epidemiology of this outbreak, it should be mentioned that the usual criterion for admitting a patient to the hospital was the finding of a temperature above 100° at the dispensary. A great many of the milder cases of upper respiratory infection were thus screened out—at least as many as were hospitalized. But this screening did not apply to the more severe upper respiratory infections, and even less to the pneumonias. One check on the incidence of unrecognized pneumonia was provided by one organization, consisting of 34 personnel, 13 members of which were in the hospital with respiratory infections at one time. All remaining members were called in for mass x-ray check-up. All chests were clear.

The experience with this organization is also illustrative of the mode of transmission of the infection, which appeared to be by contact, contact with co-workers or barracks neighbors. From the few patients with atypical pneumonia, whose infective contact could be determined with some certainty, the incubation period ranged from 9 to 16 days. An incidental finding of interest was the apparent immunity of medical officers, nurses, and ward

attendants—personnel whose contact with respiratory infections was close; and the considerable susceptibility of hospital personnel whose contact with patients was tangeential. Enlisted men working in the laboratory, in the x-ray department, and in the admitting office came down with respiratory infections of varying severity.

Clinical characteristics.—The clinical characteristics of primary atypical pneumonia in the India-Burma theater coincided closely with those reported in outbreaks of the disease in the United States. The majority of the cases were troubled initially with an apparent upper respiratory infection, which ranged from a mild nasopharyngitis to a severe bronchitis. A dry, hacking cough was a conspicuously disturbing symptom in many of the patients. Two symptoms frequently mentioned as rare in primary atypical pneumonia were found rather commonly in the patients in this theater. In Captain Gootnick's report just mentioned, he stated as follows: "(1) Repeated shaking chills lasting 15 to 45 minutes were recorded in 25 of the 96 patients. (2) Aching in the chest (apart from the usual substernal soreness), referred to the involved side, occurred in 19 patients. In nine of these, sharp stabbing pain in the chest on inspiration was the chief complaint leading to hospitalization."

Examination of the chest on admission often revealed inconstant physical signs of patch consolidation. X-ray of the chest, at this stage of the disease, frequently yielded diagnostic evidence of the characteristic changes of primary atypical pneumonia. The white blood counts and differential smears showed the usual findings, as did examination of the sputum. Blood cultures performed in representative patients were uniformly sterile. The 100th Station Hospital reported that: "A spot check for the presence of cold agglutinins was done in a total of nine cases. In 3, cold agglutinins were not present in the one sample of serum examined; in 6, the serum was positive for cold agglutinins and showed an increasing titer after the second week of illness, reaching a titer of 256 in 2 at the end of the third week."

Reports from other hospitals were essentially in agreement with Captain Gootnick's observations. An interesting finding was the occurrence of pleural reactions, a feature considered by some observers to be rare in this disease. Captain Gootnick reported 4 cases with pleural rub. The 73d Evacuation Hospital reported 6 pleural reactions—2 in Americans and 4 in Chinese. Of these, 1 American and 1 Chinese patient had small effusions. The 99th Station Hospital reported on 24 cases, of which 2 showed pleural rubs. Another feature noted in all reports and also observed in previous reports on atypical pneumonia was the high proportion of cases that were afebrile or showed only a low-grade temperature.

Sequelae.—Very few significant complications or sequelae were reported from this theater. The 99th Station Hospital observed one case of extension from one lung field to the other. The 234th General Hospital reported one mild case of purulent bronchitis following the pneumonia, and the 73d Evacuation Hospital found one case with suggestive findings of bronchiectasis. There was no followup report on these cases.

Bronchial asthma

Little statistical information is available regarding the incidence of bronchial asthma in the India-Burma theater. The condition was more frequent than might be anticipated and was prone to recur even after hospitalization induced temporary improvement. If returned to duty, the patients contributed little of military value and were almost always finally sent to the Zone of Interior. Twenty-three such patients were sent to the United States during 1944 from the 142d General Hospital, 68 from the 181st General Hospital, Karachi, India, and 76 from the 20th General Hospital. In this connection, a personal communication from Colonel Cottrell of the 142d General Hospital is of interest:

India is a bad country for allergic conditions. Many persons who had had allergic symptoms find that they are much worse than in the U.S., or that new manifestations appear—e.g. a person who had hay-fever in childhood develops asthma in India. Sometimes, one can return a mild asthmatic to duty for a time, but I have never seen one that lasted long. In general, if a soldier has been seen to have an unequivocal, moderately severe, asthmatic attack, it is useless to return him to duty in this country. I suspect that molds are important as allergens here, but I do not know.

Not infrequently, individuals who had never had allergic manifestations prior to service in the theater were affected with disabling allergic conditions. In general, skin testing was not performed and when performed was of little assistance in diagnosis or therapy. Climate, allergens, and psychologic stress and strain were presumably etiologic factors, but the extent to which each or all were contributory cannot be stated.

Pulmonary tuberculosis

The incidence of pulmonary tuberculosis among the military personnel in the theater was low (table 9). Among the Chinese, however, tuberculosis was prevalent. An ETMD report, dated 3 May 1945, from the 48th Evacuation Hospital stressed this high incidence of tuberculosis in Chinese patients who constituted the bulk of the hospital census. The average Chinese soldier neither understood the American interest in sanitation nor was he particularly interested in practicing its precepts. The Chinese used no precautions in the disposition of their sputum, the floor being most convenient for expectoration. The personnel of the 48th Evacuation Hospital were, therefore, extensively exposed to the disease. Frequent, routine checks were made on the personnel and, up to the time of the report, no cases of tuberculosis were discovered that could be attributed to contact with the Chinese. The commanding officer of the hospital suggested that members of the hospital staff be observed carefully for some time after return to the United States.

Homologous Serum Jaundice and Infectious Hepatitis

Infectious hepatitis was under continuous surveillance by the theater surgeon from the very beginning of the establishment of the USAFCBI

theater in March 1942. On 30 May 1942, a cable was received from the Surgeon General's Office alerting the theater to jaundice of unknown etiology following administration of yellow fever vaccine. Among the first cases to be reported from the India-Burma theater were seven instances of jaundice following yellow fever vaccination in United States troops. General Stilwell himself developed jaundice on 3 June 1942, having received vaccine from lot No. 334 on 2 February 1942.

From the available scattered and incomplete reports, it is apparent that many cases of jaundice of unknown etiology were observed in 1942 and that a significant number of these patients had had vaccine from lot Nos. 334, 335, 338, and 367. In a report by the Surgeon, USAFCBI, 17 October 1942, to The Surgeon General, complete questionnaires on 80 cases of jaundice without known cause were transmitted. Thirty-six of this series had received yellow fever vaccine from lot Nos. 331, 335, and 371. Of the other cases, 19 had had contact with jaundiced patients. On 28 November 1942, another report of 35 patients was submitted, most of whom had received yellow fever vaccine from lots of the 300 series. Complete information regarding the number and distribution of the cases following yellow fever inoculation was not available, but it was apparent that the number constituted a serious problem.

The only available comprehensive report was submitted from the 73d Evacuation Hospital by Colonel Ware, Capt. (later Maj.) Coleman B. Hendricks, MC, and Capt. Thomas H. Brem, MC. The 405 patients who constituted the basis of the study had all received yellow fever vaccine at approximately the same time. Information concerning the lot numbers and the exact date of inoculation was recorded in 305 cases. The report read, in part, as follows:

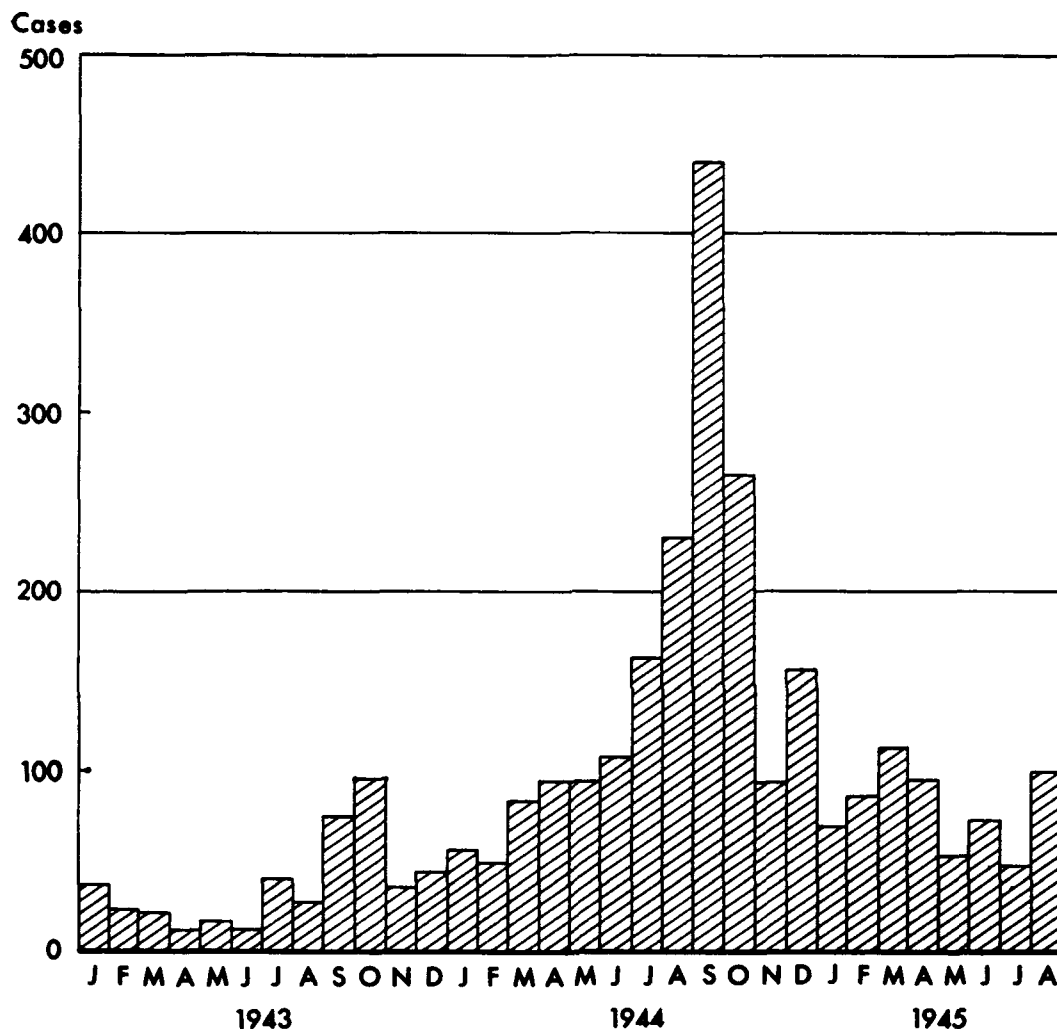
For all lots of yellow fever vaccine, the majority of patients became ill between 70 and 110 days after inoculation, the peak being reached between 90 and 100 days. Extreme variations were 46 and 170 days. Although 18 different lots of vaccine are included, two particular lots account for 222 of the 305 cases. In each of these two major lots of vaccine the peaks of incubation period occur at such distinctly different times as to be highly suggestive—lot No. 367 at 70 days and lot No. 338 at 100 days, while the peak of the aggregate of all cases falls at approximately 90 days.

The clinical course, including the symptomatology and physical signs, was that observed in the extensive series of cases observed elsewhere in the U.S. Army. No deaths occurred.

The energetic action initiated by The Surgeon General was effective in subduing the outbreaks of postvaccinal jaundice in the U.S. Army. In a letter dated 21 December 1942 from Col. (later Brig. Gen.) Stanhope Bayne-Jones, MC, Office of the Surgeon General, to the Surgeon, the opinion was expressed that the cases reported from the China-Burma-India theater in the last months of 1942 were probably unrelated to the administration of yellow fever vaccine. The cases of infectious hepatitis occurring in 1943 and thereafter were consequently to be considered in a similar light.

CHART 16.—*Incidence of infectious hepatitis in U.S. Army troops in India-Burma theater, January 1943–August 1945*^{1 2}

[Preliminary data based on summaries of statistical health reports]



¹ Includes cases admitted in China prior to November 1944.

² Two deaths occurred in 1944: 1 in September and 1 in November.

The incidence of infectious hepatitis during 1943, 1944, and 1945 is graphically presented in chart 16 and table 10. In accordance with experience in the North African theater and in the Northern Hemisphere, a seasonal increase during the late summer months, particularly in September and October, was apparent. This increased incidence reflected an increased number of cases occurring sporadically throughout the theater and also occasional outbreaks. The clinical characteristics observed in these cases of infectious hepatitis coincided with those witnessed elsewhere in the U.S. Army.

TABLE 10.—*Incidence of infectious hepatitis in U.S. Army troops in India-Burma theater, by month and year, January 1943–July 1945*¹

Month	Infectious hepatitis		
	1943	1944	1945
	<i>Number of cases</i>	<i>Number of cases</i>	<i>Number of cases</i>
January.....	38	56	70
February.....	24	49	87
March.....	22	83	114
April.....	12	95	95
May.....	17	95	53
June.....	13	108	73
July.....	41	163	47
August.....	28	230	
September.....	74	² 439	
October.....	94	265	
November.....	35	² 94	
December.....	44	157	

¹ Includes cases admitted in China prior to November 1944.

² Two deaths occurred in 1944: 1 in September and 1 in November.

Source: Blumgart, Herrman L., and Pike, George M.: *History of Internal Medicine in India-Burma Theater*. [Official record.]

Occasional sporadic groups of cases were observed from time to time. During August 1944, 122 patients with infectious hepatitis were admitted to the 98th Station Hospital, Chakulia, India, from 14 units in the theater. As in other outbreaks, the source of infection was undetermined. These cases were considered to be unrelated to the administration of yellow fever vaccine. A similar increased incidence had been noted 1 year previously. The fact that a considerable proportion of these cases originated in two of the 14 units is of epidemiologic interest. It was evident that the increased incidence of infectious hepatitis in the two units was not related to troop strength.

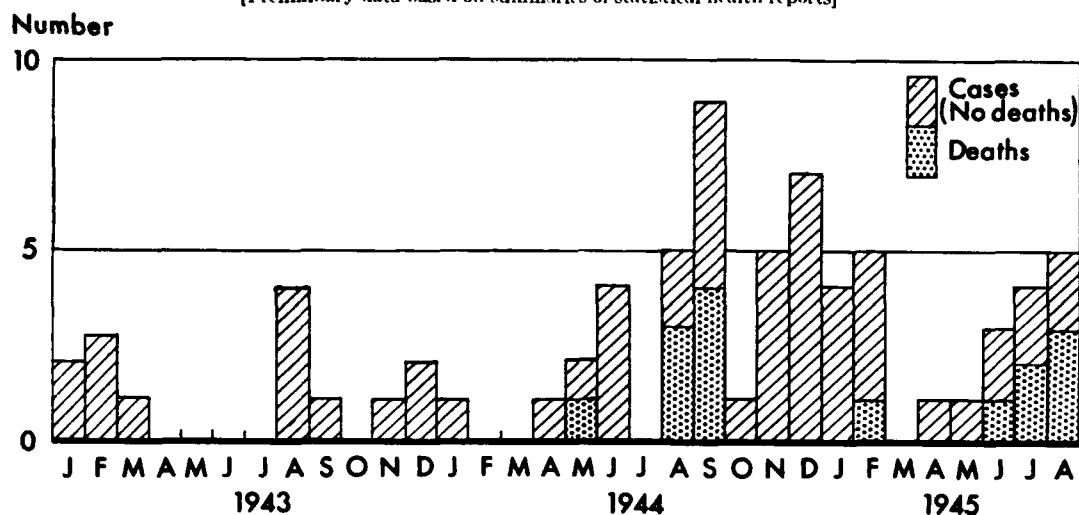
Poliomyelitis

No statistics concerning the incidence of poliomyelitis among the native population could be uncovered. Clinical observation on casual visits in the congested districts of Karachi, Delhi, and Calcutta impressed the visitor with the rather frequently observed residual flaccid paralyses. It is of interest, however, that experience in the British Army in India reveals a low incidence in Indian troops as compared with British troops.

Poliomyelitis was seen only sporadically in the military personnel of the India-Burma theater. The case fatality ratio, between 20 and 25 percent, the ever-present possibility of an epidemic, and the effect on morale when sporadic cases appeared made the disease one that commanded continuous consideration (table 11 and chart 17).

CHART 17.—*Incidence and deaths due to poliomyelitis in U.S. Army troops in India-Burma theater, January 1943–August 1945*¹

[Preliminary data based on summaries of statistical health reports]



¹ Includes cases admitted in China prior to November 1944.

There were no major outbreaks of poliomyelitis; a focus of three cases, however, occurred in Agra, India, during September 1945, and this area was accordingly placed out of bounds to all personnel except those on official military business. In the British Army, a seasonal increased incidence was evident from March to October for the years 1942–44. The data of table 11 are too small to be of statistical significance in this connection. The incidence of respiratory and/or bulbar involvement in U.S. military personnel was apparently high although no compilation of experience was available. In a group of 10 cases at the 263d General Hospital, Calcutta, India, in August and September 1944, there were 7 cases of respiratory paralysis or bulbar paralysis or both; 4 of the 10 patients died because of respiratory paralysis.

The clinical characteristics of poliomyelitis in the India-Burma theater were identical with those seen in the United States. The principal problem was the supply and maintenance of the respirators. With sporadic cases occurring at installations thousands of miles apart and often in relatively secluded places, it was imperative to maintain respirators at certain key points in usable condition ready for immediate air transport. One Drinker-Collins respirator was kept in readiness at Ledo and one at Karachi, and two were stationed in Calcutta. Arrangements were made with the British for the loan of mechanical respirators. Several of these were used but were unsatisfactory. They were subject to mechanical breakdown, and the bellows almost invariably developed leaks. By maintaining competent technicians constantly on duty, however, these respirators were invaluable in emergencies. "Savalife" respirators, employed at several installations, were useful in emergencies and during air transport of patients. They were found impracticable

for prolonged use, as indicated in a letter to the Surgeon General's Office from the Surgeon, USAFIBT:

Even with the best nursing care the machine was extremely uncomfortable with pressure from the metal and intense itching and maceration of the body tissues from constant contact with the rubber. As a result there were many macerated and blistered areas around the neck, trunk and arms.

The apparatus is sufficiently difficult to remove and replace as to make it impossible (because of the time element involved) 1st, to give the skin proper care and 2d, to allow the patient to have periods out of the machine so that he can begin using his own respiratory muscles as tolerated.

There were numerous mechanical difficulties. One death was attributed to mechanical failure of one of the British respirators, and on another occasion a hand bellows was used for 9 hours while the respirator was being repaired. In general, however, the use of the British respirators, with the splendid co-operation of the Air Transport Command in rushing a respirator to any installation immediately on call, proved adequate in the treatment of emergencies.

TABLE 11.—Incidence of poliomyelitis in U.S. Army troops, India-Burma theater, by month and year, 1942-45 ¹

Month	Poliomyelitis			
	1942 ²	1943	1944	1945
	<i>Number of cases</i>	<i>Number of cases</i>	<i>Number of cases</i>	<i>Number of cases</i>
January		2	1	4
February		3	0	5
March		1	0	0
April		0	1	1
May		0	2	1
June		0	4	3
July		0	0	4
August		4	5	5
September	0	1	9	
October	1	0	1	
November	1	1	5	
December	0	2	7	
Total	2	14	³ 35	⁴ 23

¹ Includes cases admitted in China prior to November 1944.

² No statistics for the first 8 months of 1942.

³ Includes 8 deaths: 1 in May, 3 in August, and 4 in September.

⁴ Includes 6 deaths: 1 in February, 1 in June, 3 in July, and 1 in August.

Source: Blumgart, Herrman L., and Pike, George M.: History of Internal Medicine in India-Burma Theater. [Official record.]

Typhoid and Paratyphoid Fevers

Although the statistics for typhoid and paratyphoid fever in the native population were grossly inaccurate, it was evident from the available information that enteric fever was widespread. Statistics in India always err on the low side because of the impossibility of obtaining accurate health reports. In one town, an epidemic was recognized by the medical staff of the local hospital only because of the unusual number of cases of fever that were being treated as outpatients at a time when malaria was not prevalent. In the 1940 annual report of the Health Commissioner of India, there were 1,738 deaths recorded in Delhi Province as due to enteric fever. Delhi City contributed 683 to this figure, and New Delhi, the capital of British India and certainly one of the best controlled cities in India from a public health standpoint, was responsible for 72. The rest came from the rural areas.

No epidemics occurred in U.S. Army personnel, but sporadic cases were reported throughout the 3½ years of the theater's existence. Table 12 shows the number of cases of typhoid fever; table 13 shows the cases of paratyphoid fever (A and B are not differentiated).

TABLE 12.—*Incidence of typhoid fever in U.S. Army troops in India-Burma theater, by month and year, 1942-45*¹

Month	Typhoid fever			
	1942 ²	1943	1944	1945
	<i>Number of cases</i>	<i>Number of cases</i>	<i>Number of cases</i>	<i>Number of cases</i>
January.....		1	2	2
February.....		0	6	4
March.....		0	1	0
April.....		1	6	1
May.....		1	6	1
June.....		4	7	0
July.....		0	5	0
August.....		1	4	1
September.....	1	0	6	
October.....	2	2	3	
November.....	2	5	0	
December.....	2	6	2	
Total.....	7	21	48	9

¹ Includes cases admitted in China prior to November 1944.

Figures may be higher than the actual incidences. In reviewing some of the clinical summaries, it was obvious that certain cases were diagnosed as typhoid or paratyphoid solely on the basis of agglutinations of a relatively low titer, and these may have been of the anamnestic type.

² No statistics reported until September 1942.

Source: Blumgart, Herrman, L., and Pike, George M.: History of Internal Medicine in India-Burma Theater. [Official record.]

TABLE 13.—Incidence of paratyphoid fever in U.S. Army troops in India-Burma theater, by month and year, 1942-45¹

Month	Paratyphoid fever			
	1942 ²	1943	1944	1945
	Number of cases	Number of cases	Number of cases	Number of cases
January.....		0	6	1
February.....		1	0	1
March.....		0	0	4
April.....		0	3	4
May.....		0	4	1
June.....		0	6	5
July.....		0	2	0
August.....		0	6	2
September.....	1	0	6	
October.....	0	1	5	
November.....	0	4	2	
December.....	0	1	5	
Total.....	1	7	45	18

¹ Includes cases admitted in China prior to November 1944.

Figures may be higher than the actual incidences. In reviewing some of the clinical summaries, it was obvious that certain cases were diagnosed as typhoid or paratyphoid solely on the basis of agglutinations of a relatively low titer, and these may have been of the anamnestic type.

² No statistics reported until September 1942.

Source: Blumgart, Herrman L., and Pike, George M.: *History of Internal Medicine in India-Burma Theater*. [Official record.]

The first case of typhoid fever, reported in September 1942, was in a soldier stationed in Delhi. He was treated at the British Military Hospital, Delhi Cantonment, where the diagnosis was established by positive blood culture. One week later a case of paratyphoid A developed, which was also treated by the British. In October 1942, a soldier from the Delhi area was admitted to the 100th Station Hospital and proved to have typhoid fever; in the following month, a fourth patient was admitted and the case was diagnosed as typhoid fever. Three of these patients were from the headquarters squadron of the Tenth Air Force, but no common source of infection was found.

As a consequence of these cases, it was suspected that the antityphoid vaccine prepared in the United States was not highly effective against Indian strains, and it was directed that U.S. military personnel in China, Burma, and India be required to take a stimulating dose of Indian-type typhoid vaccine. This policy was also adopted by the British Army, whose experience was similar to that of the U.S. Army. Although this program was carried out for a brief period, it was later discontinued, apparently on advice from the Surgeon General's Office. It is impossible to say whether the incidence of typhoid and paratyphoid fever was affected.

No unusual clinical problems were encountered; in general, diagnoses were arrived at more slowly because of the lack of laboratory facilities. There

were only three deaths from typhoid fever. This low mortality rate in a country where the typhoid micro-organisms have lost none of their virulence, at least for the native population, demonstrates the efficacy of antityphoid immunization.

Smallpox

The 1939 annual report of the Public Health Commissioner of India on smallpox begins as follows: "The epidemiological statistics published by the League of Nations shows that British India ranks higher than all other countries in its rate of incidence of smallpox." The disease is endemic in India, with localized minor epidemics occurring at all times during the year with a seasonal peak around March, April, and May. A cyclic increase in incidence occurs every 5 or 6 years. This is attributed to the increased proportion of susceptible children, a result of the inefficient enforcement of vaccination. An epidemic year was expected in 1942 or 1943; actually it occurred in 1944 and 1945.

No cases of smallpox were reported in U.S. military personnel in 1942 and 1943. Table 14 shows the cases and deaths by months for 1944 and 1945. The first case was admitted to the 111th Station Hospital at Chabua and, as far as could be determined, was acquired from Chinese soldiers in the nearby staging area. Subsequent cases resulted from contacts with both the native Indian population and the Chinese troops.

TABLE 14.—Incidence of smallpox in U.S. Army troops in India-Burma theater, by month and year, 1944-45 ¹

Month	Smallpox	
	1944	1945
	<i>Number of cases</i>	<i>Number of cases</i>
January.....	1	0
February.....	2	2
March.....	14	8
April.....	3	7
May.....	2	0
June.....	0	0
July.....	1	0
August.....	0	0
September.....	0	
October.....	0	
November.....	0	
December.....	0	
Total.....	² 23	³ 17

¹ Includes cases admitted in China prior to November 1944.

² Includes 6 deaths: 2 in February, 3 in March, and 1 in July.

³ Includes 4 deaths: 2 in February and 2 in April.

Source: Blumgart, Herrman L., and Pike, George M.: *History of Internal Medicine in India-Burma Theater*. [Official record.]

Although the incidence of smallpox in U.S. Army troops was not high, the fact that it occurred at all was of great concern to the Preventive Medicine Section of the theater surgeon's office, and many investigations were carried out, as reported by that section. The essential finding that emerged from most of these studies was that either vaccination had not been accomplished recently or, if it had been, an immune reaction was recorded on the immunization register without sufficiently careful observation to distinguish between an immune reaction and an unsuccessful vaccination.

The disease was frequently severe and the case fatality ratio high. Sulfonamides and penicillin were used to combat secondary infection. The only unusual clinical problem that arose was the differentiation between generalized vaccinia and smallpox in 4 cases seen at the 18th Field Hospital and reported on by Major Mosley. These 4 cases, 1 of which was fatal, were originally reported as generalized vaccinia, because the patients had been vaccinated 5, 7, 3, and 4 days before the onset of their illness. However, investigations by the theater epidemiologist, Major Mosley, revealed exposure in each case to the native population at either Bombay or Calcutta at a time when smallpox was at its peak incidence. Major Mosley concluded that these cases of generalized vaccinia were actually instances of smallpox.

In view of the prevalence of smallpox, the theater policy was vaccination every 12 months; in addition, whenever a diagnosis of smallpox was made, all units in the vicinity of the suspected source were revaccinated. When the actual number of cases of smallpox among U.S. Army troops is considered in relation to the possibilities of exposure to this extremely virulent disease, the immunization program may be regarded as highly successful.

Cholera

Cholera is endemic in India and constituted a constant potential threat to U.S. military personnel. Its prevalence in lower Bengal and other localities in close proximity to Army installations provoked energetic preventive measures, as described elsewhere.

Despite particularly heavy outbreaks in 1945, such as that in Calcutta, an area where many troops were stationed and were on leave, not a single case occurred in military personnel in the India-Burma theater from 1942 to October 1945. On 20 July 1945, the theater surgeon addressed a letter to the surgeons of the base, intermediate and advance sections, alerting all medical officers to the possible occurrence of cholera and advising certain modifications in the treatment outlined in TB Med 138, February 1945, subject: Cholera. One mild case was observed in a Red Cross worker who had been repeatedly vaccinated in accordance with theater policy. At the 181st General Hospital where she was hospitalized, *Vibrio cholerae* was isolated from the stools, and the finding was confirmed at the 9th Medical Laboratory. The patient made an uneventful recovery.

This remarkable record of no morbidity in military personnel in the theater is to be attributed to the close supervision of water supplies, the sanitation of the messes, the educational programs, the continued inspection of civilian restaurants, quarantine of native areas and establishments when indicated, and the strict enforcement of the cholera-vaccination program.

Melioidosis

Cases of melioidosis are recorded, mostly from Burma, predominantly in males. Although only about 100 cases have been recorded in the past 30 years since the disease was first described, there is reason to believe it is more widespread than the diagnosis would indicate. In Rangoon, the estimated incidence is 4.5 per million. It is of interest that a case of this disease was diagnosed in a U.S. soldier and verified by recovery of the micro-organism from skin pustules and blood culture while the patient was alive and from post mortem abscesses from the lung, blood, liver, and spleen, by the 9th Medical Laboratory. Identification of the micro-organism of melioidosis was confirmed by the Army Medical School, Washington, D.C.

The disease is extremely varied in its manifestations and readily escapes diagnosis. The condition may simulate cholera, pneumonia, pyemia, plague, or typhoid fever. The case reported in the April 1945 *Field Medical Bulletin*, by Lieutenant Cox and Major Arbogast, exhibited the pyemia syndrome. The patient had been ill 24 hours before admission with headache; fever and chills, accompanied by nausea and vomiting; and pain in the chest, the lower back, and the joints of the lower extremities. He had been a mule skinner, and some of his mules had died of the illness. During the 7 days in hospital before death, he developed scattered pustules over the entire body with a septic temperature ranging as high as 103° and 105° F. and the appearance of pneumonic consolidation of the base of the left lung. Laboratory studies revealed a white count of 7,000-9,000 and a red count of from 2.5 to 3.5 million; the causative micro-organism was recovered from cultures of the blood and contents of the skin pustules. During the last 2 days of the patient's life, 40,000 units of penicillin were administered intramuscularly every 4 hours but without discernible effect. Post mortem examination revealed the characteristic findings of this disease.

The disease has been recorded as uniformly fatal, but with earlier diagnosis and newer modes of chemotherapy the course of the disease may be favorably affected.

Schistosomiasis

No cases of schistosomiasis originated in the India-Burma theater. Twelve cases caused by *Schistosoma haematobium* were reported in a letter, dated 11 January 1945, from the Surgeon, 329th Air Service Group, to the Surgeon, U.S. Army Air Forces, IBT. In all of these cases, the disease was acquired when the group bathed in a pond while traveling across Africa. All the

patients had symptoms of pyelitis or cystitis and 60 percent had hematuria. Two patients were evacuated to the United States; the remainder eventually became free of symptoms following several courses of treatment with Fuadin (stibophen).

Leishmaniasis

Cutaneous leishmaniasis or kala-azar was seen but rarely in this theater. Reliable statistics were not available, but it appears that only 1 case was reported in U.S. military personnel in the theater in 1944 and 13 cases in the first 5 months of 1945. Kala-azar is especially prevalent among the native population of Bengal and Assam, but relatively uncommon among the white people in those areas. The low incidence among those enjoying better living conditions and among military personnel is probably to be attributed in part to protective measures against insects, which are particularly effective against the *Phlebotomus* vector of the disease with its flight range of not more than a few hundred yards.

A few cases of kala-azar were seen at the 48th Evacuation Hospital and other installations caring for Chinese military personnel. Of the 14 cases reported among U.S. military personnel, 8 were studied at the 142d General Hospital. All had evidently contracted the disease in India, and *Leishmania* were demonstrated in 7 of the 8 cases; in the remaining 1 case, the diagnosis was established by the clinical course and response to treatment, in spite of 3 negative sternal punctures. The experience of the 142d General Hospital with these cases was summarized in the theater ETMD report dated 1 July 1945, which reads, in part, as follows:

The average time elapsing from apparent onset of illness until the diagnosis was established was about two months; the longest time was one hundred and twenty-one days and shortest (in a case diagnosed before transfer here) was twelve days. This wide variation suggests that Medical Officers' "index of suspicion" of kala-azar has been too low, and it is noteworthy that this "index", in the staff of this Service, has risen sharply. The remittent and recurring nature of the fever has, in many cases, led to diagnoses such as typhoid fever, paratyphoid fever, brucellosis, amebic abscess of liver or spleen, malaria, and dengue at one time or another. The matter is further complicated by the not infrequent coincidental occurrence of malaria or amebiasis. One patient had had several hospitalizations for undiagnosed febrile illnesses which, in retrospect, were exacerbations and remissions of kala-azar.

The clinical findings and the course of the disease in these patients were in accord with common experience as described in TB MED 183, July 1945, subject: Visceral Leishmaniasis-Kala-azar. The diagnosis was suspected by reason of unexplained fever for several weeks, comparative well-being of the patient, and gradual enlargement of the spleen and liver together with the characteristic blood changes. The definitive diagnosis was established by sternal puncture. Splenic puncture was not practiced. Since the cases were relatively recent in origin, the formol-gel reaction and the distilled-water tests were of little help.

Response to treatment was generally satisfactory. Fuadin (trivalent antimony) given to 2 patients appeared to be entirely ineffective and in 1 case was followed by an alarming febrile episode of several days' duration.

The ETMD report states:

The pentavalent antimony preparation Neostam was given to three of these patients, and Neostibosan to five. Both have proved effective, but Neostibosan appears to be distinctly the better of the two. The total dosage of Neostam has been from 4.0 to 4.7 gm., and of Neostibosan from 3.0 to 3.6 gm. One of the eight patients is now under treatment. The other seven have made apparently complete clinical recovery.

Every effort was made to emphasize the necessity of considering kala-azar in the differential diagnosis of fevers of undetermined origin. The increased number of cases reported in 1945 was possibly in part attributable to raising the level of suspicion in the medical officers of this theater. It is not improbable, however, that in some instances of this infection the diagnosis was missed.

EVALUATION OF CONSULTANT SYSTEM

Detailed descriptions of the educational and editorial activities of Colonel Blumgart, his role in furthering clinical research, and his relationships with other consultants have been delineated. Further comments have been made on these activities in relation to the problems posed by specific diseases. The following comments concern an evaluation of the consultant system as it operated in the theater.

On the basis of 3 years of experience as consultant in medicine (2 years in the Zone of Interior and 1 year in the India-Burma and the China theaters) the author considers the consultant system to be invaluable in enhancing the quality of medical care.

In the India-Burma theater, the role of the consultant as a two-way ambassador between the theater surgeon in Delhi and the installations in the field facilitated the interpretation of higher policy and directives of headquarters to those engaged in caring for the soldiers and conversely permitted bringing to the attention of higher authority some of the problems in the field. Important knowledge and experience gained in some of the installations could be transmitted to other installations having only fragmentary experience with certain diseases and conditions of medical practice.

The isolation in this theater arising from wide dispersion of units and poor lines of communication frequently resulted in medical officers having no opportunity to discuss professional matters with anyone other than their immediate associates. Colonel Blumgart's visits established a line of professional communication with theater headquarters. The improvement in morale was one of the most gratifying consequences of the consultant system.

CHAPTER IX

Field Armies

Garfield G. Duncan, M.D.

Field armies were the last major commands to which consultants were assigned in World War II. The first assignment was to the Sixth U.S. Army operating in the Southwest Pacific Area. In some field armies, the army surgeons were reluctant to receive or assign consultants. Misgivings as to their usefulness delayed appointments and prevented immediate adoption of the plan on all fronts. However, as medical consultants to field armies proved their worth, they were welcomed by all.

The various consultants and the armies in which they functioned are presented in appendix A (p. 829).

From the medical point of view, there was no more satisfying assignment than that of consultant. At its best, it afforded an effective combination of clinical, research, supervisory, and administrative activities, which carried responsibility sufficient not only to satisfy but to tax the medical officer best qualified for the appointment. There could be no greater challenge and stimulus than grappling with new medical problems involving large bodies of men and the effectiveness of the military effort.

Officially, there was no clear definition of the duties of the medical consultants. They were confronted by a great variety of problems under widely varying conditions in many parts of the globe. Furthermore, owing to existing staff organization, the Surgeon General's Office exercised no direct control over medical activities overseas. Consequently, in the field armies, the capabilities of the consultants were utilized wisely, or not so wisely, according to the vision of the army surgeon.

The consultants themselves were quick to recognize the great opportunity to salvage sick and wounded in forward areas of a combat zone. Most of them had seen such patients as they proceeded back through the chain of medical evacuation (fig. 259) to the general hospitals and had been impressed with the wastage in manpower and its overall effect on fighting strength at the front. They were aware, as some apparently were not, that it was possible to provide excellent medical service to troops in the frontlines (fig. 260).

The account in this chapter is drawn largely from the reports of consultants to the Ninth and Fifteenth U.S. Armies in the European theater and from the reports of consultants to the Sixth, Eighth, and Tenth U.S. Armies



FIGURE 259. Litter jeep, early link in chain of medical evacuation, Manila, Philippine Islands, February 1945.

in the Pacific.¹ The experiences of the consultants of the First and Third U.S. Armies in the European theater are briefly discussed in chapter IV.

INTERNAL MEDICINE AT THE FRONT

Clinical Problems

The variety and nature of the major problems in internal medicine with which consultants to the field armies were concerned are illustrated by experiences in the Sixth, Seventh, Ninth, and Fifteenth U.S. Armies.

The Sixth U.S. Army, in the Pacific, had problems concerning malaria, dengue, scrub typhus, hepatitis, schistosomiasis, poliomyelitis, dysentery (bacillary and amebic), and venereal diseases.

The Seventh U.S. Army, operating in Tunisia and Italy, experienced malaria, trenchfoot, hepatitis, enteritis, and typhus (epidemic).

The Ninth U.S. Army, in France and Germany (fig. 261), encountered major problems concerning traumatic shock, trenchfoot, venereal disease,

1. (1) McKee, Lt. Col. John R.: Medical Consultant's Activities, Ninth U.S. Army, 13 May 1944-9 May 1945. [Official record.] (2) Smith, Lt. Col. Carter: Activities of the Medical Consultant of the Fifteenth U.S. Army, 1 September 1944-25 July 1945. [Official record.] (3) Duncan, Col. Garfield G.: Activities of the Medical Consultant With the Sixth Army, 19 August 1943-8 May 1944. [Official record.] (4) Shull, Lt. Col. Harrison J.: Experiences of the Consultant in Medicine, Sixth U.S. Army, 6 June 1945-10 December 1945. [Official record.] (5) Kimbrough, Lt. Col. Robert C., Jr.: Activities of the Medical Consultant to the Eighth Army, 1 June 1945-2 October 1945. [Official record.] (6) Martin, Col. Walter B.: Report of Medical Consultant With the Tenth Army, 3 July 1944-15 October 1945. [Official record.]



FIG. 260. First-aid medical service. (Adapted from *Frontier*, 12 April, 1944.)

primary atypical pneumonia, and hepatitis and had lesser problems concerning primary pneumonia, diphtheria, scarlet fever, and meningococcal meningitis.

The Fifteenth U.S. Army, in France and Germany, was concerned with tuberculosis, notably in displaced Soviet personnel presumably not exposed to infection previously (fig. 262); typhus epidemic; malnutrition in displaced persons, refugees, and recovered Allied military personnel; diphtheria, including cutaneous diphtheria; typhoid fever in displaced persons' camps; hepatitis; acute infections of the respiratory tract; recurrent acute attacks of malaria; an outbreak of methyl alcohol poisoning in a camp for displaced Soviet nationals; and venereal diseases.

An illustration of a clinical problem, which was attacked through the efforts of a medical consultant, and of the solution which resulted in the salvaging of combat personnel, is found in a study on malaria in the Sixth U.S. Army. This study is described briefly in the following paragraphs.

Two infantry divisions, the 32d and 41st, were returned to Australia from New Guinea after the Buna-Gona campaign because the great majority of personnel were subject to recurring acute attacks of malaria. Several months elapsed, with the 32d Division staying at Camp Cable near Brisbane and the 41st at Rockhampton, with no greater prospect of the unit's returning to combat (fig. 263). In fact, recurrences continued to account for a malaria attack rate of between 2,000 and 4,000 attacks per annum per 1,000 average strength. In August 1943, Lt. Col. (later Col.) Garfield G. Duncan, MC



FIGURE 261. 110th Evacuation Hospital, Ninth U.S. Army, Kamp, Germany, 21 March 1945.

(fig. 264). Consultant in Medicine, Sixth U.S. Army, was assigned to the Sixth Army Training Center at Rockhampton, organized to rehabilitate these malaria-ridden divisions. The objective, the method of study, and the results are shown in the following summary.

Objective. The purpose in establishing the Sixth Army Training Center was to receive from combat units personnel proved to be infected with malaria and to prepare them, as regards health, for combat duty. The medical consultant, appointed surgeon of the center, was instructed as follows: "In view of the disappointing results yielded in many cases by methods now in practice in both therapeutic and suppressive treatment of malaria, the Surgeon of the Center will, with the approval of proper authority, make a diligent search to discover and institute other and more promising means of dealing with this problem."

Methods and material. In pursuing this objective, the malarial personnel were divided into companies, and Atabrine (quinacrine hydrochloride) was administered according to seven different programs. In all instances, Atabrine was given after the evening meal, by roster, and under supervision of commissioned officers to insure that no personnel could escape taking the drug. Four battalions of malarial troops were thus studied (fig. 265).



FIGURE 262. Processing liberated Soviet prisoners of war at Lippstadt, Germany, May 1945. A. Entrance to camps 1 and 2. B. Delousing at camp No. 17.

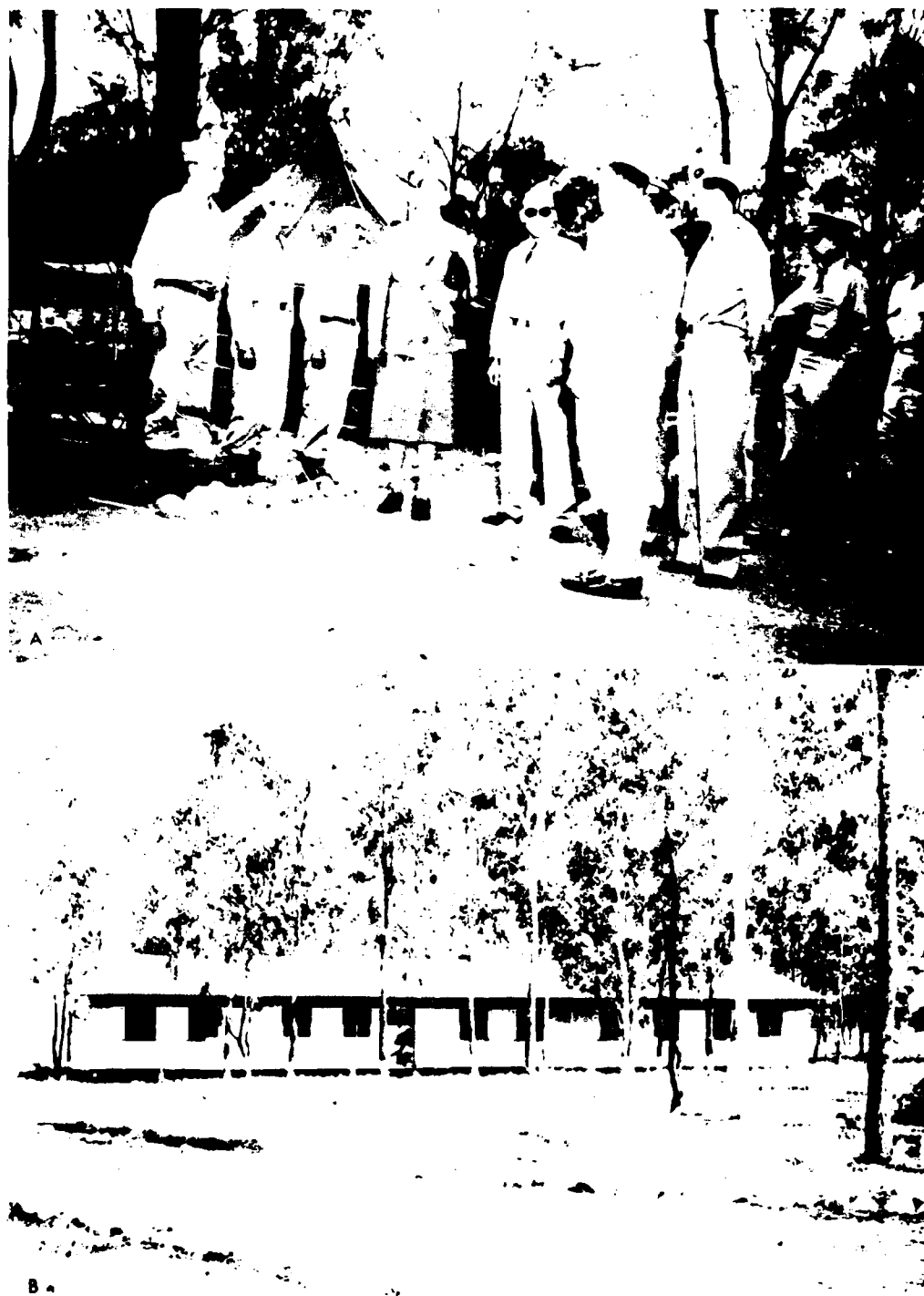


FIGURE 263. U.S. 11th Infantry Division at Rockhampton, Queensland, Australia. A. Mrs. Franklin D. Roosevelt, inspecting tent area of Headquarters Company, 186th Infantry, with Maj. Gen. Horace H. Fuller, USA (wearing dark glasses), Commanding General, 9 September 1943. B. Division headquarters, 5 June 1944.



Col. Garfield G. Duncan, MC, Consultant in Medicine, Office of the Surgeon, Sixth U.S. Army; and Consultant in Medicine, Office of the Surgeon, Second Service Command.



Col. Walter B. Martin, MC, Consultant in Medicine, Office of the Surgeon, Fifth Service Command; and Consultant in Medicine, Office of the Surgeon, Tenth U.S. Army.



Lt. Col. Nathan Weil, MC, Consultant in Medicine, Office of the Surgeon, Third U.S. Army.



Lt. Col. Douglas Donald, MC, Consultant in Medicine, Office of the Surgeon, Fifth U.S. Army.

FIGURE 264. Consultants in medicine, field armies.

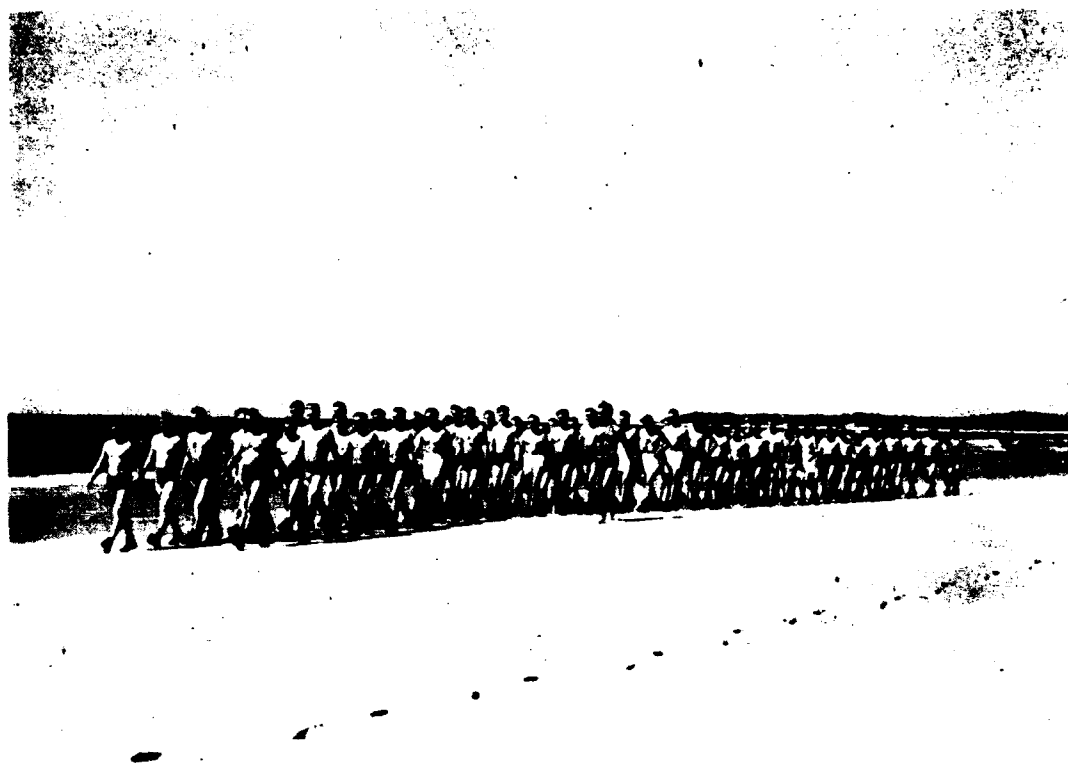


FIGURE 265.—4th Casual Company, Convalescent Battalion, 32d Division, marching to beach for supervised swimming, Point Fingal, New South Wales, Australia, 20 April 1943.

Parallel studies were conducted so as to reveal unfavorable as well as favorable results following the several regimes of suppressive treatment. The comparative studies were based on (1) the average daily attendance at sick call from the respective companies, (2) admissions to the hospital for all causes, and (3) admissions to the hospital for proven recurrent attacks of malaria. Closely observed were patients with tachycardia, splenomegaly, change hemoglobin value, loss of weight, abdominal pain, diarrhea, vomiting, fever, arterial hypertension, albuminuria, blood smears positive for malaria micro-organisms, and increased "Atabrine tint" in skin and sclerae. Particular consideration was given to changes in body weight, to the concentration of Atabrine in the blood under the several regimes, and to reclassification of soldiers to light training.

Results.— The following results were observed:

1. Each one of several Atabrine suppressive regimes was found effective in abruptly and completely eliminating recurring attacks of malaria, and it was concluded that poor administration of the drug previously had permitted a high percentage of the men to avoid taking it.
2. Intensive military training for 4 weeks, including 2 in which the exercise periods exceeded 80 hours per week, did not precipitate acute attacks of malaria in any of the soldiers on suppressive Atabrine therapy (fig. 266).



FIGURE 266.—Intensive military training for 3d Casual Company, Convalescent Battalion, 32d Division, Point Fingal, New South Wales, Australia, 29 April 1943.

3. Recurrent attacks reappeared from 2 to 4 weeks after discontinuing suppressive therapy.

Outbreaks of malaria occurring subsequently were invariably traced to failure to comply with instructions issued from Sixth U.S. Army Headquarters regarding the procedures for administering Atabrine. A notable outbreak occurred in the 127th Infantry of the 32d Infantry Division at Finschhafen on New Guinea. The break in discipline was detected by the consultant, and, within 1 week after its correction, the malarial rate fell to zero. As a result of adhering to the regimes of suppressive treatment instituted at the Sixth Army Training Center, the 32d and 41st Divisions were rehabilitated and returned to combat. Greater details of this enterprise have been published elsewhere.²

Clinical Investigations

It is of course not so easy to carry on carefully controlled clinical observations in a field army as in the more stable circumstances of the communications zone or the Zone of Interior. Nonetheless, important problems arise

² Duncan, G. G.: Quinaerine Hydrochloride as a Malaria Suppressive Agent for Combat Troops. War Med. 8: 305-318, 1946.



FIGURE 267. Col. John R. Hall, MC, Surgeon, X Corps, Sixth U.S. Army, demonstrating effects of atomic bomb to members of Far Eastern Advisory Commission, Hiroshima, Japan, 26 January 1946.

in these areas that need on-the-spot investigation. Actual conditions existent in the field frequently cannot be reproduced for adequate trial of field problems in rear areas. Such questions as those posed by exotic diseases, by new therapeutic measures, and by new drugs and antibiotics cannot be postponed to a more convenient season. Adequately trained personnel are rarely available for carefully conducted studies, but much can be done with personnel that are available if the medical consultant is alert to such needs.

Among such investigations, there was a study of anebiasis initiated in the Americal Division on the Island of Cebu during August of 1945 but not completed because of the collapse of Japan and the unexpected movement of the division. Studies of the late effects upon civilians in the Hiroshima and Nagasaki areas of Japan following the explosion of the atom bomb were supervised by a special committee from General Headquarters, Army Forces, Pacific. In this study, the medical consultant of the Sixth U.S. Army gave assistance in locating and gathering data from civilian hospitals within the the command (fig. 267). The study in the Sixth U.S. Army on the use of Atabrine has been summarized, with its results directly bearing upon the maintenance of combat strength.



FIGURE 268. —Shock tent in a forward medical unit of the Fifth U.S. Army, Italy, 1944.

In the future, it should be possible to expedite assignment of experienced investigators to undertake appropriate problems in forward areas. This need was well filled during the later stages of the war.

Treatment of Shock

The number of patients passing through the preoperative and post-operative shock wards was very large during the active phase of operations (fig. 268). The surgeons being fully occupied in the operating rooms, the internists, including the medical consultants, became interested in the shock problem. In general, teams had not been organized or instructed in shock therapy or in the proper physical setup of shock wards. Considerable confusion and inefficiency resulted. Although the rate of recovery from battle wounds was extremely good, it could have been improved. The use of large quantities of blood and blood substitutes in combating shock was an invaluable aid, but when not properly directed it was capable of great harm (fig. 269).



FIGURE 269.—Use of blood and blood substitutes in field armies. A. Plasma administered during difficult over-water evacuation in Philippines. B. Blood distribution truck with 8th Evacuation Hospital, Fifth U.S. Army, Cecina, Italy, May 1944.



FIGURE 270. Clinical laboratory of 8th Evacuation Hospital, Fifth U.S. Army, Italy, 13 January 1945.

Laboratory aids were a necessary adjunct to a good shock service. In the early period of a military tactical operation, the surgical demands were usually heavier than the medical load. The physiologic problems involved and the frequency of chest complications did, in fact, make the treatment of shock primarily a problem for the internist. Accordingly, efficiency would have been promoted by putting the shock wards under the medical service of a medical treatment facility. The chief of medicine would then be responsible for the organization, training, and instruction of shock teams and for the proper integration of the laboratory service and shock service. This should have been accomplished before engaging in tactical operations.

Laboratory Work

The medical consultants were inevitably concerned also with the work of the clinical laboratory (fig. 270). Too frequently, in mobile medical units, the individual officer responsible for the laboratory had had no previous experience in laboratory service and often had little interest in it. There is evidence in the tables of organization, especially for field hospitals and medical clearing companies, and in the individuals selected to perform laboratory work that its importance to clinical medicine was not always recognized. Dependable parasitologic work was a prerequisite to superior professional care in the Pacific. The writer, as a medical consultant, believed that the laboratory service in mobile medical installations should have been made a supervisory

responsibility of the chief of the medical service who was dependent upon this service for accurate assistance. The consultant in medicine repeatedly encouraged as close an approximation as possible to such a relationship (p. 825).

A specialized laboratory unit under the direction of Lt. (later Maj.) Frederik B. Bang, MC, was of great assistance in determining the concentrations of Atabrine in the blood that followed the various malaria-suppressive regimes being evaluated at the Sixth Army Training Center. Such highly specialized units proved of outstanding value in dealing with major medical problems.

Evacuation

During the war, in the Pacific particularly, disease conditions greatly exceeded the number of surgical cases. At least 70 percent of medical cases in the field can be treated and returned to their units in a relatively short time, so also can 70 percent of the less seriously wounded. The medical evacuation of experienced soldiers over long lines of communications and their replacement by unseasoned recruits is an expensive and wasteful procedure, unjustified if medical facilities for the care of such casualties can be made available near the front. Many thousands of minor medical and surgical casualties were so evacuated in World War II. This practice was unfortunate because such casualties clog the lines of communication and crowd the hospitals to the rear (fig. 271). They absorbed the attention of personnel much needed forward. Furthermore, their disabilities tend to become fixed in their minds, particularly in the case of psychoneurotic patients. It was the experience of the Army in all theaters, and especially in the Pacific, that patients once evacuated from field army areas returned to the fighting front only after long delays, if at all. Their permanent loss from their units served to exaggerate in the minds of the remaining soldiers the severity of the unit's casualty rate. The value of better medical treatment facilities near the front—better equipment and properly trained personnel—thus becomes evident. In short, excellent medical care yields its highest return to the fighting strength of an army if it is brought to bear upon disease problems as near as possible to the point where they originate.

MEDICAL SERVICE IN FORWARD AREAS

In World War II, advances in the science of medicine and improvements in equipment, communications, and transportation had made possible a forward movement of good medical service to the frontlines. This, apparently, was not fully realized or accepted by some officers seemingly obsessed with a concept of evacuation to fixed hospitals. The attitude of these officers was reflected in the lack of emphasis placed on the professional efficiency of field medical units and on the competency of pivotal medical officers.

It was fully recognized in the Office of the Surgeon General that in a rapidly expanding medical service with most of the officers drawn from civil life, the



FIGURE 271.—Crowded facilities of 49th General Hospital at Manila Jockey Club, Manila Philippine Islands, 16 April 1945.

field armies urgently needed the advice of highly trained internists who could, visit and directly influence the units concerned with the care of the sick and wounded. Evaluation of professional personnel, their assignment according to professional qualifications, professional training of units, estimation of the character and quantity of materials needed and of the overall medical service required to meet the demands of impending tactical operations—all were matters requiring expert medical advice.

During the planning phase of operations, however, the services of the medical consultants were not always fully utilized. In some instances, they had no definite place or fixed responsibility in the office of the army surgeon.

The evaluation of the professional capabilities of the medical units before entering on an operation makes possible the correction of many defects. It was amply proved, as the war progressed, that, when the consultants visited units assigned to or earmarked for impending operations, their recommendations, properly implemented, were highly effective in increasing the standards of medical service in these units. Inadequacies in the quality of personnel, in the training of shock teams, and in the quality of laboratory service noted during



FIGURE 272. Lt. Gen. Walter Krueger, USA, Commanding General, Sixth U.S. Army, on A-plus-2-day, visiting clearing station of 7th Infantry Division, Leyte, Philippine Islands, 22 October 1944.

active operations resulted from lack of attention to these matters during the planning and training period.

Unit and divisional medical services supported by surgical and evacuation hospitals—including field hospitals serving as evacuation hospitals—were most instrumental in saving lives and preventing disabilities. Army consultants believed that the choice medical and surgical personnel should be concentrated at the division clearing station and evacuation hospital levels (fig. 272). During operations, therefore, the consultants were engaged in briefing new units arriving in the combat area and in visiting units in operation—particularly clearing stations; evacuation, surgical, and field hospitals; and, facilities where casualties were being concentrated for further evacuation (fig. 273). They also supervised shock work and advised the army surgeon on the assignment, transfer, or reassignment of personnel. The greater part of the consultants' time was spent in the medical and shock wards in direct contact with the care of patients. The experience thus gained brought into focus defects in the human and other material at hand or in the use of these materials.

Reports from the consultants to Sixth, Eighth, Ninth, Tenth, and Fifteenth U.S. Armies (fig. 274) comment in detail upon shortcomings in the



FIGURE 273. --Extremely busy 24th Field Hospital at recaptured Fort Stotsenburg, Luzon, Philippine Islands. A. Casualties arrive by jeep and ambulance. B. Casualties, medical and surgical, crowded into field house.

(Right) Lt. Col. John B. McKee, MC,
Consultant in Medicine, Office of the Sur-
geon, Ninth U.S. Army.

(Lower left) Lt. Col. Carter Smith, MC,
Consultant in Medicine, Office of the Sur-
geon, Fifteenth U.S. Army.

(Lower right) Col. Worth B. Daniels,
MC, Consultant in Medicine, Office of the
Surgeon, Eighth U.S. Army.



FIGURE 274. Consultants in medicine, field armies.

medical service of field units, criticizing particularly the lack of professional training of many of the officers in charge of the medical and laboratory services. The responsibility for this lay both within and without the field army. Officer assignments being usually made during the organization and planning period, field units often came to the army improperly staffed. Within the field armies, not enough attention was paid to evaluating the units on the basis of professional organization and the competency of their personnel. When such surveys were made and recommendations submitted, they were, in not a few instances, ignored. For example, repeated recommendations for the transfer of well-trained officers from subordinate positions where they were malassigned to positions of greater responsibility in keeping with their medical training and experience and in the interest of better medical care were repeatedly refused. In some cases, the problem was met by having a professionally competent junior officer take over the work and responsibility without the corresponding rank, pay, or recognition. This situation was in part, but by no means wholly, due to a shortage of internists. Experience shows that promotions of temporary officers should be conditioned principally by professional efficiency and not by length of service or age.

Within the Sixth U.S. Army area, there was an inadequate number of well-trained internists for the proper staffing of the medical units within the command. It is believed that each field hospital and each evacuation hospital should have as chief of its medical service a Medical Corps officer with qualifications equivalent to the requirements for certification by the American Board of Internal Medicine. The few installations in the Sixth U.S. Army that had well-qualified chiefs of medical service were without exception the units that provided medical service of superior quality. When Col. Harrison J. Shull, MC, reported on duty as Consultant in Medicine, Sixth U.S. Army, there was little evidence that any careful, systematic review of professional qualifications of internists in the Sixth U.S. Army medical units had been carried out, there having been no medical consultant assigned to the Sixth U.S. Army for more than a year. Such an evaluation was undertaken and, upon completion, reassignment was recommended for several medical officers who were obviously malassigned. Not one of the recommended changes was effected, although five of the officers recommended for reassignment had qualifications equivalent to the requirements of the American Board of Internal Medicine or the American Board of Pediatrics.

Deference to the reluctance of lower echelon commanders to release well-qualified medical officers who had been malassigned, all too frequently prohibited such obviously needed changes. In addition, the absolute shortage of specialists in internal medicine, and indeed of young Medical Corps officers without specialty training, further increased the difficulty of exchanging and transferring personnel. As a result, officers once placed in an assignment frequently were fixed there for long periods, even though there might be general agreement as to the advisability of their transfer. No more important problem

faces the Army Medical Service in future operations than to provide an adequate method of evaluating and properly assigning its officer personnel.

The indoctrination of the newly commissioned civilian physician in Army procedures need take relatively little time. It would seem that services of medical officers in units awaiting active field service could, and should, be utilized by temporary assignments to hospitals in the Zone of Interior and the communications zone or used to augment units of a similar type already committed to combat. A limited number of officers with units assigned to the latter echelons were brought forward early, and they gained invaluable experience, which added greatly to the effectiveness of their own units when the units entered into active operation.

The tables of organization of both the evacuation and field hospitals, but especially field hospitals, did not permit the assignment of specialists in internal medicine of the higher caliber that medical problems of these hospitals demand. There should be further consideration of the tables of organization of these hospitals with upward revisions to assure official approval of the type of professional officers needed in these installations.

SCOPE OF CONSULTANT ACTIVITIES

In the preceding pages, the conditions and opportunities peculiar to consultant assignments to field armies have been briefly sketched and illustrated by some particular examples. In what follows, there is somewhat more emphasis on the principles that emerged as a result of these experiences.

The consultant in medicine in a field army is the representative of the army surgeon in the field of internal medicine. He is an advisor to the army surgeon on general and special problems pertaining to the treatment of disease among the troops. It is his duty to keep the army surgeon informed as to the quality of medical care being furnished by medical units of the command and to make such recommendations to the surgeon and, upon approval of the surgeon, to the units in lower echelon of the command, as the consultant believes indicated for improved care of patients. Within the army surgeon's office, there should be the closest relationship between the medical consultant and other members of the surgeon's staff to the end that the consultant may make appropriate recommendations concerning the proper assignment of Medical Corps officers with special training in internal medicine, the procurement of special drugs and equipment, and such changes in hospitalization policy as may be necessary for adequate care of the sick. The consultant should have knowledge of the plans for impending tactical operations in order that he may be prepared to offer professional advice. Furthermore, in the army surgeon's office, he is the representative of the interests of all internists in medical installations of the command and his relationship with them can be, and often is, of great importance in maintaining morale. The consultant can also serve as an extremely valuable medium of exchange of information between units within the field army and between sources outside the field army and medical officers within the command. He also has an opportunity for stimulating excellence of professional

performance and interest in clinical observations and in continuing self-education among medical officers.

It was unfortunate that a clear-cut, official statement of the duties of professional consultants did not appear in an appropriate War Department publication during the war. Such an official statement would have made it easier for the army surgeon to utilize appropriately the consultants' capabilities and would have made more uniform their activities in all organizations. It would have assisted the consultant greatly in making his way among Medical Department and line officers who frequently are not cognizant of the contributions the consultant is in a position to make.

Since field armies were the last of the major commands to receive consultants, it is not surprising perhaps that certain aspects of consultant activities were not readily accepted in army commands as fully as they had come to be accepted in the Office of the Surgeon General and in service commands in the Zone of Interior. When Sixth U.S. Army Headquarters was first organized in the Zone of Interior, no professional consultants were assigned. Absence of these officers during the early days of the army's operations subsequently handicapped the surgeon by a shortage of position vacancies when consultants became available. Furthermore, it made it more difficult for the consultant, when he was later assigned, to integrate his activity appropriately into the operating plan of the army surgeon's office. The surgeon's office should be, in fact, a team of officers making their best collective contribution to the accomplishment of the surgeon's duties (fig. 275). It is important, therefore, that the place of the professional consultant on this team be clearly defined and that a professional consultant in internal medicine should function from the beginning and continuously in order that his part in the team play may be utilized to the fullest. The consultant in medicine should be assigned to each field army well before it starts on its oversea mission, and, when changes in assigned individuals become necessary, the vacancies created should be filled promptly.

Visits to Field Installations

General activities.—No other function of the consultant in a field army is more important than that of making regular visits to field medical facilities. His activities there may be described briefly, as performed, typically, in the Sixth U.S. Army.

Approximately 75 percent of the medical consultant's time was spent with medical personnel of the forward medical units. Systematic visits were made to each unit caring for patients; that is, field, evacuation, and portable surgical hospitals and clearing stations. In addition, visits were made to division surgeons and corps surgeons and their assistants in venereal disease control and to the division medical inspector. In the Philippines and in Japan, transportation for such visits to readily accessible units was by motor, usually jeeps, while more distant, less accessible units were visited by plane or, in some instances, by boat. Often, the medical and surgical consultants

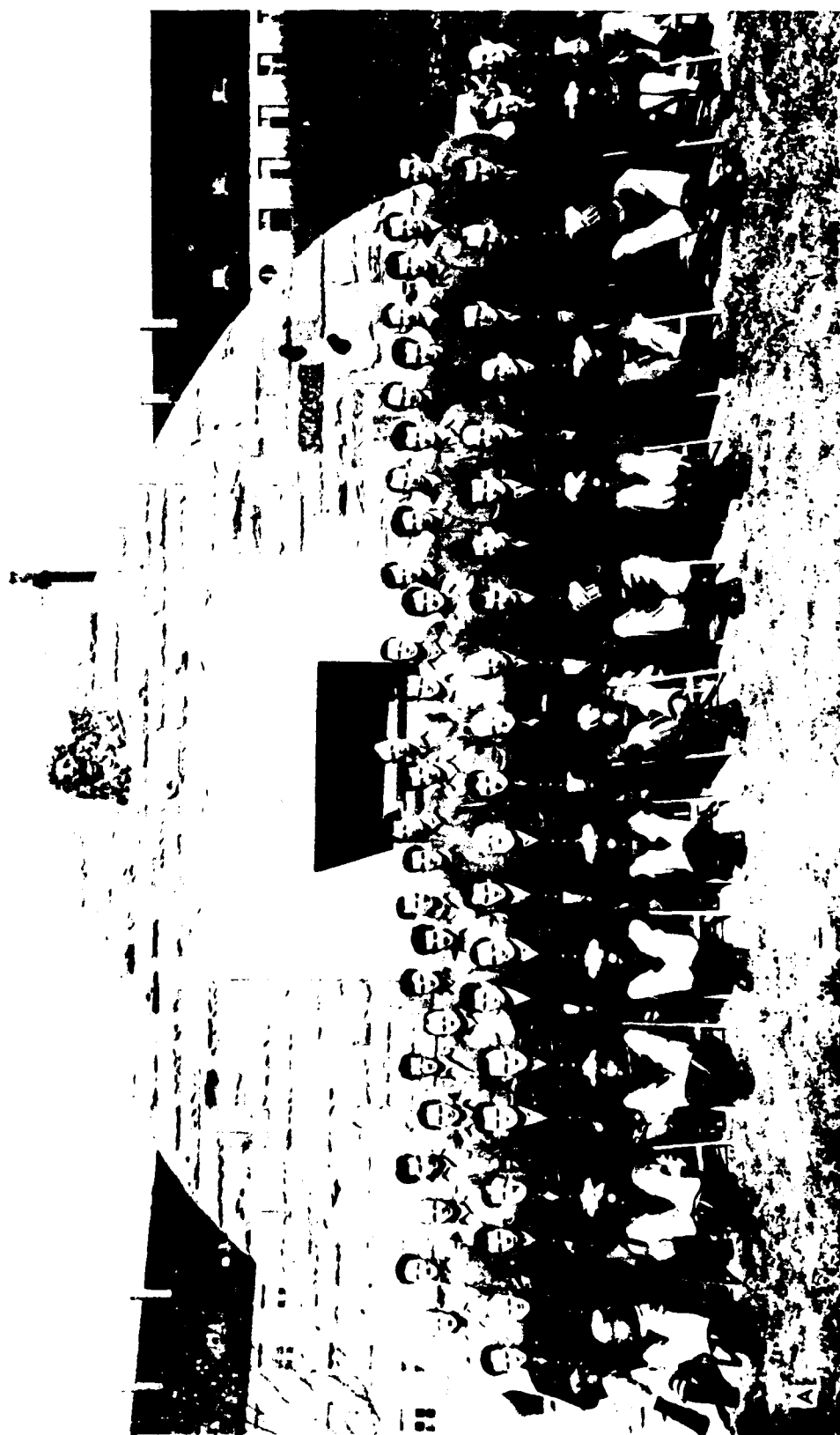


FIGURE 275. Officers of the medical sections, Third and Eighth, U.S. Armies, A. Medical Section, Headquarters, Third U.S. Army, Frankfurt, Germany, April 1945.



FIGURE 275. Continued. B. Medical Section, Headquarters, Eighth U.S. Army, in the Philippines, 29 March 1945.

or the medical and neuropsychiatric consultants traveled together, as this joint effort proved mutually helpful. The sharing of local facilities for shelter and food with officers of the unit being visited contributed to an understanding of the personal problems of medical officers and to a closer relationship between the professional consultants of the army surgeon's office and individuals in the field units. Every effort was made to have internists, in the field unit in particular, and all medical officers, in general, feel that in the medical consultant each medical officer had a professional friend with a keen interest in his personal problems, having himself no interests except those concerned with the care of patients. Such relationships were often of value in extending the effectiveness of the consultant's work.

At each unit, care was taken to visit individual patients on the wards with the medical officer in charge. Here, it was possible to evaluate the quality of diagnostic studies and therapy. In bedside discussions, suggestions for further management, as indicated, could be made tactfully. It was sought to have as many officers of the medical service as possible attend such ward rounds and, when possible, officers responsible for laboratory and X-ray studies were asked to be present also. These informal bedside discussions concerning patients proved to be exceedingly illuminating and professionally stimulating both to medical officers in charge of patients and to the consultant.



FIGURE 276. Army headquarters area, Sixth U.S. Army, San Fernando, Pampanga, Luzon, Philippine Islands, 20 May 1945.

Observations on the professional proficiency of individual medical officers would be used as a guide in making recommendations to the army surgeon's headquarters concerning appropriate assignments (fig. 276).

Supply problems at local installations were also reviewed as they related to the management of patients, in order to obtain assistance at army headquarters in correcting deficiencies (fig. 277).

Exchange of ideas. The movement of the consultants from one command to another served as a valuable means of exchanging ideas and information. Every effort was made by means of available publications, directives, bulletins, and by conversation to bring to each group the latest information available bearing on field medicine; for example, the technique of penicillin therapy in the early days of its use. By reason of their daily contact with all of the medical services in the area, the consultants were able to keep the surgeon informed as to the capabilities of the various units and the patient load they could carry. In addition, the consultants in an area were able to pass on to newly arrived units the experiences of units already engaged in active operations. Often, newly arrived medical officers were assigned to the front to augment active units. The consultants were able to train these officers before their own units were actually put into active operations.



FIGURE 277. Medical supply services in a field army. A. Sixth U.S. Army Medical Supply Depot, Tarlac, Philippines, 1945. B. Medical supply point, 34th Infantry Division, Italy, 1945.

Dissemination of Professional Information

One of the unfilled needs of field armies during World War II was the provision of adequate professional information to medical officers with forward units. The farther forward in the combat area the medical officer was assigned, the more difficult it was for him to get help from medical literature and Medical Department publications concerning professional practices. Thus, the battalion surgeon in his aid station frequently had little or no available reference material. Although technical bulletins of the Medical Department are intended to reach medical officers in the forward areas, these bulletins frequently failed to arrive. The facilities for distribution of the War Department technical bulletins were not adequate to place these publications in the hands of the medical officers with combat troops. Nor indeed were these bulletins delivered with sufficient regularity and promptness into the hands of medical officers of mobile hospital units. The distribution of the *Bulletin of the U.S. Army Medical Department*, which was mailed by APO number to individual medical officers wherever possible, was received with greater regularity and more promptly. Library facilities in the form of textbooks were generally available in the mobile medical units. Current journals were received from time to time but usually several months late. It was, therefore, needful for the medical consultant to interest himself in the dissemination of medical information. He was sometimes able to assist in obtaining textbooks and journals. Because of the special value and importance of Medical Department technical bulletins, it was arranged to have published for all the hospitals of the commands an up-to-date list of the bulletins and instructions as to how the missing issues might be secured. The bimonthly Sixth U.S. Army *Medical Bulletin* served for timely comment concerning matters of importance. Also, as has been noted, the consultant transmitted verbally pertinent information obtained at one installation to others throughout the command.

Training and Refresher Programs

Opportunity for continued training, professional refreshment, and self-education should be provided in maximum amount in Army installations. Encouragement of medical meetings, formal ward rounds, journal clubs, and similar educational exercises in field armies during times of action did not, however, meet with much success. Often, there was lacking in these hospitals the type of professional leadership that makes regular rounds on the medical services and between the medical and surgical services a stimulating experience. In addition, the mobile character of the unit, with fluctuating patient loads under combat conditions, frequently made organized rounds and, especially, formal medical meetings difficult to maintain. Except in isolated instances, encouragement of these activities met with little enthusiasm. With improvement of the quality of professional personnel in mobile units by the addition of medical officers with interest and training in teaching procedures, it should be possible to stimulate greater interest in local exercises for self-education.

After the close of the Luzon campaign, three plans were instituted with the purpose of professional refreshment. One of these had as its aim the further training of laboratory technicians, with the hope of continually improving the quality of laboratory technical work in forward installations. It was arranged to send selected laboratory technicians from each army medical installation to the 26th Medical Laboratory (Sixth U.S. Army) for a period of refresher training.³ A second educational plan was the holding of clinics at selected forward medical installations for members of their staffs and Medical Corps officers in the adjacent area on professional problems arising in forward areas. One series of such clinics was concerned with dermatologic conditions.⁴ To supervise and conduct these clinics, the Sixth U.S. Army headquarters was fortunate in having assigned Lt. Col. Charles L. Schmidt, MC, as Consultant in Dermatology, Sixth U.S. Army. The clinics in dermatology were received with enthusiasm.

The third type of refresher training was inaugurated and conducted under the auspices of Army Forces Western Pacific in fixed installations of the communications zone. Refresher work of 4 weeks' duration was offered in tropical diseases and laboratory procedures, as well as in general internal medicine. This program was hardly under way when hostilities ceased, and the courses were abandoned.

Cooperative Relationships

The medical consultant maintained the closest professional relationships with the surgical and the neuropsychiatric consultants, to their mutual benefit. Although in the Sixth U.S. Army the neuropsychiatric consultant was assigned officially as assistant to the medical consultant, he was requested by the medical consultant to carry on his activities freely and directly with the Army surgeon. It is believed that the neuropsychiatric consultant should hold an assignment in the army surgeon's office comparable to that of the medical and surgical consultants. Relationships with the medical inspector (preventive medicine officer) were likewise close and helpful. Although a satisfactory working arrangement in relation to the army medical laboratory was agreed upon with the medical inspector, whereby the medical consultant was expected to interest himself in laboratory procedures as they relate to the care of patients in army hospitals, it should again be pointed out that clinical laboratory procedures are most intimately the concern of the internists in the army area. Laboratory examinations related to preventive medicine, such as food and water analysis, constitute a relatively very small part of the work of the army laboratory. Furthermore, the internist is by official and professional interest and training more closely associated with the professional problems that

³ (1) Memorandum, Consultant in Medicine, Sixth U.S. Army, to Acting Surgeon, 23 July 1945, subject: Refresher Course in Laboratory Procedures. (2) Letter, Office of the Surgeon, Headquarters, Sixth U.S. Army, to Consultant in Medicine, 27 July 1945, subject: Refresher Course in Laboratory Procedures.

⁴ Memorandum, Consultant in Dermatology, Sixth U.S. Army, to Consultant in Medicine, 25 July 1945, subject: Instructions in Common Dermatological Problems and Outline of Instruction Course in Dermatology.

concern the laboratory personnel than is the medical inspector. Experience indicates that the consultant in medicine rather than the preventive medicine officer should have supervisory responsibility over laboratory procedures within the army area.

Liaison with the statistical section of the surgeon's office was close and satisfactory, as it was also with the supply section.

In order to serve most effectively, the consultant should have a broad general knowledge of the plans for an operation as they are advanced. He should be informed as to anticipated conditions of the objective, the terrain, sanitation, water supply, density of civil population, disease prevalence, and expected resistance. He should have knowledge as to troop strength and as to the number and character of supporting medical units and the echeloning of such units. In some instances, the rather curious attitude was taken that mature, highly trained officers accustomed to dealing with confidential matters were not to be entrusted with secret material freely shared by young officers in other branches with little background of experience or training. The medical consultant is the adviser to the army surgeon in all matters that fall within the field of his special knowledge and should deal freely with the sections on plans, training and operation, personnel, preventive medicine, and supply.

The consultant in medicine in the Sixth U.S. Army made a special effort to maintain closest relationship and frequently to exchange information with the consultants of medicine in the Eighth U.S. Army in Army Forces, Western Pacific and in Army Forces, Pacific. On more than one occasion, arrangements were made to have one of these consultants visit installations within the Sixth U.S. Army area and to assist in the handling of professional problems existing there.

SUMMARY AND COMMENT

The experience of medical consultants with the field armies was similar to that of medical consultants generally in the Second World War. It was their particular mission to activate the principle that it is now possible to bring good medical care to the frontlines. The policy of evacuation to fixed hospitals is wasteful from every point of view; some 70 percent of medical cases and of the less severely wounded, can be treated in forward areas and returned promptly to their units. The consultants were therefore basically concerned with the proper evaluation and full use of the professional capabilities of all medical officers and with the equipment and organization of all field installations. It is here, indeed, that the best in medical care can make its most direct contribution to maintaining the fighting strength of the Army.

The medical consultants were directly concerned with training medical units, before a tactical operation when possible, and with the dissemination of ideas and medical information. By the logic of experience, clinical laboratory procedures in the field and the treatment of shock became their special interests. They were concerned with clinical studies which, in spite of dif-

difficulties in forward areas, yielded some results of great immediacy, as in the use of new drugs and antibiotics, and new therapeutic techniques.

The aim of this chapter has been to present, in a general way, the duties of medical consultants assigned to field armies, the difficulties they encountered, and the conditions they thought might be improved. A disproportionate amount of attention has perhaps been paid to these considerations and not enough to the excellence of the performance of the field army medical units. There is ample statistical proof that never before had such units reached such a high degree of efficiency as they did during World War II.

APPENDIX A

Consultants in Medicine in the Various Commands of the U.S. Army in World War II

Service Commands:

First:

Col. George P. Denny, MC

Second:

Col. Herrman L. Blumgart, MC

Col. Garfield G. Duncan, MC

Third:

Col. Thomas Fitz-Hugh, Jr., MC

Col. John Minor, MC

Col. Roy H. Turner, MC

Fourth:

Col. F. Dennette Adams, MC

Col. Henry M. Thomas, Jr., MC

Lt. Col. Richard P. Stetson, MC

Fifth:

Col. F. Dennette Adams, MC

Col. Walter B. Martin, MC

Col. Johnson McGuire, MC

Sixth:

Col. Irving S. Wright, MC

Col. Alexander Marble, MC

Lt. Col. Myles P. Baker, MC

Seventh:

Col. Edgar van Nuys Allen, MC

Eighth:

Col. Walter Bauer, MC

Col. Alexander Marble, MC

Ninth:

Col. Roger O. Egeberg, MC

Col. Verne R. Mason, MC

Col. Irving S. Wright, MC

Mediterranean Theater of Operations:

Col. Perrin H. Long, MC

European Theater of Operations:

Col. William S. Middleton, MC, Chief

Medical Consultant

Col. Yale Kneeland, Jr., MC

Col. Donald M. Pillsbury, MC

Col. Lloyd J. Thompson, MC

Lt. Col. Theodore L. Badger, MC

Lt. Col. Gordon E. Hein, MC

Base Sections:

Brittany:

Col. O. Currier McEwen, MC

Delta:

Lt. Col. Frederick W. Fitz, MC

Normandy:

Lt. Col. Theodore L. Badger, MC

European Theater of Operations - Continued

Base Sections - Continued

Oise:

Col. Richard M. McKean, MC

Lt. Col. Putman C. Lloyd, MC

United Kingdom:

Col. Yale Kneeland, Jr., MC

Lt. Col. Laurence B. Ellis, MC

Hospital Centers:

12th:

Lt. Col. Arthur D. Nichol, MC

15th:

Lt. Col. Linn F. Cooper, MC

Lt. Col. Donald T. Chamberlain, MC

801st:

Lt. Col. Elton R. Blaisdell, MC

802d:

Lt. Col. Henry P. Colmore, MC

803d:

Lt. Col. Donald T. Chamberlain, MC

Lt. Col. Carl R. Wise, MC

804th:

Lt. Col. Frederick Kellogg, MC

Lt. Col. Herbert W. Rathe, MC

805th:

Lt. Col. Laurence B. Ellis, MC

Lt. Col. Carl H. Fortune, MC

Lt. Col. Elbert L. Persons, MC

807th:

Lt. Col. Bernard A. Watson, MC

809th:

Capt. Phillip W. Morgan, MC

813th:

Lt. Col. Robert S. Baldwin, MC

Lt. Col. James S. Strang, MC

814th:

Lt. Col. Stanley C. W. Fahlstrom, MC

815th:

Lt. Col. Benjamin I. Ashe, MC

818th:

Lt. Col. Benjamin H. Rutledge, MC

819th:

Lt. Col. James S. Strang, MC

820th:

Lt. Col. Putnam C. Lloyd, MC

Southwest Pacific Area:

Col. Maurice C. Pincoffs, MC

Col. Benjamin M. Baker, MC

Southwest Pacific Area--Continued

Col. Henry M. Thomas, Jr., MC
Col. Roy H. Turner, MC
Col. Eugene C. Eppinger, MC
Col. Joseph M. Hayman, Jr., MC
Lt. Col. John V. Ambler, MC
Lt. Col. Myles P. Baker, MC
Lt. Col. Frederick T. Billings, Jr., MC
Lt. Col. Maurice A. Schnitker, MC

South Pacific Area:

Col. Benjamin M. Baker, MC
Col. Edward G. Billings, MC

Central Pacific Area:

Col. Verne R. Mason, MC

India-Burma theater:

Col. Herrman L. Blumgart, MC

Field Armies:

First U.S. Army, European theater:
Col. Neil L. Crone, MC

Third U.S. Army, European theater:

Lt. Col. Nathan Weil, Jr., MC

Fifth U.S. Army, Mediterranean theater:

Lt. Col. Douglas Donald, MC

Sixth U.S. Army,¹ Pacific:

Col. Garfield G. Duncan, MC

Col. Harrison J. Shull, MC

Seventh U.S. Army, Mediterranean and European theaters:

Lt. Col. Guy H. Gowen, MC

Eighth U.S. Army, Pacific:

Col. Worth B. Daniels, MC

Lt. Col. Robert C. Kimbrough, Jr., MC

Ninth U.S. Army, European theater:

Lt. Col. John B. McKee, MC

Tenth U.S. Army, Pacific:

Col. Walter B. Martin, MC

Fifteenth U.S. Army, European theater

Lt. Col. Carter Smith, MC

¹Col. Henry M. Thomas, Jr., MC, on permanent duty with U.S. Army Forces, Services of Supply, Southwest Pacific Area, as Consultant in Medicine, spent much time on a temporary duty status serving with the Sixth U.S. Army between the tenures of Colonels Duncan and Shull.

APPENDIX B

Programs of Conferences of Medical Consultants in the Zone of Interior 1943, 1944, and 1945

MEETING OF SERVICE COMMAND CONSULTANTS IN MEDICINE AND NEUROPSYCHIATRY, OFFICE OF THE SURGEON GENERAL, WASHINGTON, D.C.

25 and 26 October 1943

AGENDA

MONDAY, 25 OCTOBER 1943

9:00 a.m., joint meeting, room 826

1. Meeting opened by----- Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine, presiding
2. Greetings----- Maj. Gen. Norman T. Kirk, The Surgeon General
3. Introduction of----- Maj. Gen. George F. Lull, the Deputy Surgeon General
Maj. Gen. David N. W. Grant, the Air Surgeon
Maj. Gen. Albert W. Kenner, Assistant to The Surgeon General
Brig. Gen. Charles C. Hillman, Chief, Professional Service
Brig. Gen. Fred W. Rankin, Chief Consultant in Surgery
Brig. Gen. James S. Simmons, Director, Preventive Medicine Division
Brig. Gen. Raymond W. Bliss, Chief, Operations Service
Col. James R. Hudnall, MC, Chief, Personnel Service
Col. William E. Shambora, MC, Surgeon, Army Ground Forces
Col. Arden Freer, MC, Director, Medical Division

10:30 a.m.

The first 5 minutes of discussion of each of the following special topics will be devoted to a general statement, after which free discussion by members of the group is invited.

4. *Reconditioning of patients*

- Discussion----- Maj. Walter E. Barton, MC, Director, Reconditioning Division
Lt. Col. Howard A. Rusk, MC, Chief, Convalescent and Rehabilitation Branch, Office of the Air Surgeon
Col. Derrick T. Vail, MC, Chief Consultant in Ophthalmology, European Theater of Operations
Col. Rex L. Diveley, MC, Chief Consultant in Orthopedic Surgery, European Theater of Operations

5. *Psychological preparation of the patient for return to duty or for discharge to civil life*

- Discussion----- Col. Franklin G. Ebaugh, MC, Consultant in Neuropsychiatry, Eighth Service Command

12:00 noon, adjournment for lunch

1:30 p.m. to 5:00 p.m.—separate meetings

Meeting of consultants in medicine, room 826

Meeting of consultants in neuropsychiatry, room 1125

TUESDAY, 26 OCTOBER 1943

9:00 a.m. to 12:00 noon, separate meetings

Meeting of consultants in medicine, room 826

Meeting of consultants in neuropsychiatry, room 1125

12:00 noon, adjournment for lunch

1:30 p.m. to 5:00 p.m., joint meeting, room 826

1. Meeting opened by ----- Col. Roy D. Holloran, MC, Chief Consultant in Neuropsychiatry, presiding

The first 5 minutes of discussion of each of the following special topics will be devoted to a general statement, after which free discussion by members of the group is invited.

2. *Functions of the service command consultant; his relationship to the Surgeon General's Office, to the Ground Forces, to the Air Forces, and to the ports of embarkation*

Discussion----- Brig. Gen. Charles C. Hillman, Chief Professional Service

3. *Disposition of patients*

Discussion----- Col. Arden Freer, MC, Director, Medical Division

- a. Return to duty
- b. Retirement
- c. Certificate of Disability for Discharge
- d. Section VIII
- e. Section X

4. *Medical Department personnel*

Discussion----- Lt. Col. William C. Menninger, MC, Chief Consultant in Neuropsychiatry, Fourth Service Command

- a. Relationship of consultants to assignment of medical officer personnel
- b. Camp surgeons
- c. Assignment of personnel to oversea units
- d. Medical officers; chiefs of services and sections
- e. Enlisted men
- f. Nurses
- g. MAC officers and civilian secretaries
- h. Promotions
- i. Duty hours for medical personnel

5. *Education*

Discussion----- Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service Command

- a. Libraries
- b. Educational exercises
- c. Ward rounds
- d. Clinical pathological conferences
- e. Journal clubs
- f. X-ray and laboratory conferences

6. *Collection and exchange of medical information within the Medical Department*

Discussion----- Lt. Col. Harrison J. Shull, MC, Medicine Branch, Office of the Surgeon General

- a. Formal and informal reports of consultants
- b. Overseas reports
- c. Surgeon General's Office circular letters and War Department Circulars
- d. The Bulletin of the U.S. Army Medical Department
- e. Meeting of chiefs of services within service commands
- f. Medical statistics and nomenclature of diseases

7. Induction station problems

Discussion..... Lt. Col. Esmond R. Long, MC, Chief, Medicine Branch, Office of
the Surgeon General

- a. Qualifications of examining personnel
- b. Evaluation of efficiency of examination
- c. Differences in service commands
- d. Relation of C.D.D.'s to induction
- e. Special difficult medical problems

AGENDA FOR ROUND TABLE DISCUSSIONS

The first 5 minutes of each special topic listed on these round table discussions will be devoted to a general statement, after which free discussion by members of the group is invited.

MONDAY, 25 OCTOBER 1943

1:30 p.m. to 5:00 p.m., room 826

Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine, presiding

1:30 p.m.

1. Professional service in Army hospitals

Discussion..... Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service
Command

- a. Adequacy of personnel
- b. Histories; physical examinations; use of laboratory and X-ray facilities and their interpretation; records
- c. Therapy, including sulfonamides
- d. Dietetics
- e. Psychological aspects of the patient's illness
- f. Length of hospitalization

3:00 p.m.

2. Methods used in carrying out duties of service command consultants

Discussion..... Lt. Col. E. V. Allen, MC, Consultant in Medicine, Seventh Service
Command

- a. Present difficulties
- b. Suggestions for improvement

4:00 p.m.

3. Tropical diseases

Discussion..... Lt. Col. Francis R. Dieuaide, MC, Medicine Branch, Office of the
Surgeon General

- a. Malaria: Treatment; epidemiology; policies; studies
- b. Filariasis: Policies; studies

4:30 p.m.

4. Clinical investigation in Army Medical Department

Discussion..... Lt. Col. Herrman L. Blumgart, MC, Consultant in Medicine,
Second Service Command

- a. Opportunities; policies
- b. Penicillin: What medical diseases need further investigation in the Army? Present status of its distribution and use in Army hospitals
- c. War prisoners: Studies of diseases in this group

TUESDAY, 26 OCTOBER 1943

9:00 a.m. to 12:00 noon, room 826

Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine, presiding

9:00 a.m.

1. *Epidemiological aspects of certain diseases as they relate to medical practice*

Discussion..... Lt. Col. Verne R. Mason, MC, Consultant in Medicine, Ninth Service Command

- a. Rheumatic fever
- b. Upper respiratory infections
- c. Diphtheria
- d. Streptococcal infections; scarlet fever
- e. Meningococcal infections; sulfonamide prophylaxis
- f. Malaria
- g. Rickettsial diseases
- h. Filariasis

10:00 a.m.

2. *Laboratory and X-ray services*

Discussion..... Lt. Col. F. Dennette Adams, MC, Consultant in Medicine, Fourth Service Command

- a. Equipment
- b. Adequacy of personnel
- c. Rh serum

11:00 a.m.

3. *Venereal diseases*

Discussion..... Lt. Col. T. B. Turner, MC, Venereal Disease Control Branch, Office of the Surgeon General

11:30 a.m.

4. *The use of outpatient departments, receiving wards, and Army dispensaries*

Discussion..... Col. Walter B. Martin, MC, Consultant in Medicine, Fifth Service Command

CONFERENCE OF NEUROPSYCHIATRIC CONSULTANTS

MONDAY, 25 OCTOBER 1943

Col. Roy D. Halloran, MC, Chief Consultant in Neuropsychiatry, presiding

1:30 p.m.—Plans and policies of the Neuropsychiatry Branch.

Visit of Brigadier Rees; division neuropsychiatrists; office policy regarding special subjects; personnel; training; reports of inspections. Lt. Col. Malcolm J. Farrell, MC

2:00 p.m.—Induction problems.

Plans of Selective Service System; report of special committee; special problems, personnel; role of psychologist. Lt. Col. Douglas A. Thom, MC, and Maj. Wilfred Bloomberg, MC

2:30 p.m.—Preventive psychiatry.

Screening; mental hygiene units; morale; ideology; malingering; statistics. 1st Lt. John W. Appel, MC

3:15 p.m.—Neurology.

Need for supervision; coordination between other sections; personnel; greater stress on importance; need for neuropsychiatric officers to be more neurologically astute; diagnostic procedures; management. Maj. William H. Everts, MC

4:00 p.m.—Treatment.

Psychotherapy; shock therapy; occupational therapy; management of cases; rehabilitation; responsibilities of section officers. Lt. Col. William C. Menninger, MC

4:30 p.m.—General discussion.

TUESDAY, 26 OCTOBER 1943

9:00 a.m.—Special neuropsychiatric problems in the service command.

What types do well in Army; consultations; advisability of a second screening; educational methods; nomenclature. Col. Franklin G. Ebaugh, MC

10:00 a.m.—Meeting with Maj. Gen. F. H. Osborn, Director, Special Service Division.

11:30 a.m.—General discussion.

CONFERENCE OF MILITARY AND CIVILIAN CONSULTANTS IN MEDICINE ASHFORD GENERAL HOSPITAL, WHITE SULPHUR SPRINGS, WEST VIRGINIA

30 and 31 October 1944

SUNDAY, 29 OCTOBER 1944

7:30 p.m.—The Use of Specialized Personnel on Medical Services of Army Hospitals.

Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine

Discussion:

Are personnel allotments of specialized personnel in medicine in Army hospitals adequate?

Classification of professional personnel (War Department Circular 232 (1944) and War Department Technical Manual 12-406).

Role of service command consultant in assignment of specialized personnel. Exchange of information regarding specialized personnel between service command consultants and the Medical Consultants Division.

What are the specialized personnel needs in the service commands?

Exchange of personnel within the service commands.

How can qualified personnel returning from overseas be most effectively assigned to service command installations?

Comments in consultants' reports regarding professional classification and performance of specialized personnel.

MONDAY, 30 OCTOBER 1944

8:30 a.m.—Greetings. . . Maj. Gen. Norman T. Kirk, The Surgeon General

Hospital functions in the Zone of Interior (Dispensaries; station hospitals; regional hospitals; named general hospitals; convalescent facilities).

Brig. Gen. Raymond W. Bliss, Chief of Operations Service, SGO (30 min.)

Discussion

9:15 a.m.—Problems of hospitalization. . . Dr. Eli Ginzberg, Special Assistant to Director, Hospital Division, SGO (30 min.)

Transfer of patients between hospitals in the Zone of Interior.

What kind of medical service is needed at hospitals where the work is predominantly surgical?

Anticipated bed needs in hospitals designated for medicine.

Diagnoses, sorting and distribution of patients from debarkation hospitals.

Specialized general hospitals.

What can the consultants do to help?

Discussion (60 min.)

10:45 a.m.—Recess

11:00 a.m.—Economy of Hospitalization

Most effective use of dispensaries... Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service Command (10 min.)

The O'Reilly General Plan... Col. E. V. Allen, MC, Consultant in Medicine, Seventh Service Command (10 min.)

Discussion (20 min.)

12:00 noon—Lunch

1:00 p.m.—Organization of the Reconditioning and Rehabilitation Program... Col. Augustus Thorndike, MC, Director, Reconditioning Division, SGO (15 min.)

Flow of patients—Class IV, III, II, I.

Supplementary report of reconditioning in Weekly Health Report.

Special reconditioning program at rheumatic fever center and tropical disease center.

Convalescent hospital program.

Relationship of the consultants in medicine to the reconditioning program.

Discussion (30 min.)

1:45 p.m.—The Venereal Disease Program of the Army... Lt. Col. Thomas H. Sternberg, MC, Director, Venereal Disease Control Division, SGO (15 min.)

Discussion (30 min.)

2:30 p.m.—Recess

2:45 p.m.—Sulfadiazine Prophylaxis in Upper Respiratory Infections

Experiences in Army Air Forces... Col. W. P. Holbrook, MC, Chief of Professional Service, AAF, Office of the Air Surgeon (20 min.)

Medical Department policy... Lt. Col. Thomas G. Ward, MC, Director, Epidemiology Division, SGO (10 min.)

Discussion (30 min.)

6:00 p.m.—Dinner

TUESDAY, 31 OCTOBER 1944

8:30 a.m.—Rheumatic Fever

Present policies... Lt. Col. Roy H. Turner, MC, Chief, Communicable Disease Treatment Branch, SGO (15 min.)

Results of research in rheumatic fever in the Army Air Forces... Col. W. P. Holbrook, MC, Chief of Professional Service, AAF (15 min.)

Discussion (30 min.)

9:30 a.m.—Skin Diseases in the Army

Experience in the European Theater of Operations... Col. Donald M. Pillsbury, MC, Consultant in Dermatology, European Theater of Operations (15 min.)

A lichen planus-like syndrome... Dr. John H. Stokes, Consultant in Dermatology to The Surgeon General (15 min.)

Consultants in dermatology within service commands... Lt. Col. Harrison J. Shull, MC, Chief, General Medicine Branch, SGO (10 min.)

Discussion (30 min.)

10:30 a.m.—Recess

10:45 a.m.—What can be done in the Way of Clinical Investigation in Army Hospitals...

Lt. Col. Herrman I. Blumgart, MC, Consultant in Medicine, Second Service Command (15 min.)

Discussion (15 min.)

- 11:15 a.m.—Problems of C.D.D. and Retirement...Col. Arden Freer, MC, Chief, Professional Administrative Service, SGO (30 min.)
(Disability separations from the service; retirement proceedings in general; retirement proceedings, medical officers; CDD proceedings, general; CDD proceedings in connection with WD Circular 370; CDD proceedings at separation centers; redistribution stations)
Discussion (30 min.)
- 12:15 p.m.—Lunch
- 1:15 p.m.—Tropical Diseases in the Army...Lt. Col. Francis R. Dieuaide, MC, Chief, Tropical Disease Treatment Branch, SGO (20 min.)
The Tropical Disease Center...Lt. Col. Joseph M. Hayman, Jr., MC, Chief of Medical Service, Moore General Hospital, Swannanoa, N.C. (10 min.)
Discussion (30 min.)
- 2:15 p.m.—Followup Reports of Patients Transferred from one Hospital to another...Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service Command (5 min.)
Discussion (15 min.)
- 2:35 p.m.—A Statement Relative to the History (Medical Department) of World War II...Brig. Gen. Hugh J. Morgan (15 min.)
Discussion (30 min.)
- 3:20 p.m.—Recess
- 3:30 p.m.—Other Professional or Administrative Problems (open discussion)

ADJOURN

MEETING OF MILITARY AND CIVILIAN CONSULTANTS IN MEDICINE ENGLAND GENERAL HOSPITAL, ATLANTIC CITY, NEW JERSEY

3 and 4 August 1945

FRIDAY, 3 AUGUST 1945

Morning Session

- 9:00 a.m.—Introductory remarks..... Maj. Gen. Norman T. Kirk, The Surgeon General
Welcome..... Brig. Gen. Charles M. Walson, Surgeon, Second Service Command
Col. Sidney L. Chappell, MC, Commanding Officer, England General Hospital
- Problems of internal medicine in convalescent hospitals and hospital centers..... Col. Alexander Marble, MC, Consultant in Medicine, Sixth Service Command
- The Operations Service, Office of the Surgeon General..... Brig. Gen. Raymond W. Bliss, Chief
The Resources Analysis Division, Office of the Surgeon General..... Dr. Eli Ginzberg, Director

Luncheon

Afternoon Session

1:00 p.m.—The Professional Administrative Service, Office of the Surgeon General.....	Col. Arden Freer, MC, Chief
The correlation of laboratories with medical services.....	Brig. Gen. J. S. Simmons, Chief, Preventive Medicine Service, SGO
Chemoprophylaxis.....	Brig. Gen. S. Bayne-Jones, Deputy Chief, Preventive Medicine Service, SGO
The relationship of veterinary medicine to Army medical problems..	Brig. Gen. R. A. Kelser, Chief Consultant in Veterinary Medicine
Penicillin (present status of therapy with remarks on new methods of administration,.....)	Col. John Minor, MC, Consultant in Medicine, Third Service Command
Streptomycin.....	Brig. Gen. Hugh J. Morgan, Chief Consultant in Medicine

Evening Session

General discussion of medical problems of interest to military and civilian consultants

SATURDAY, 4 AUGUST 1945

Morning Session

8:30 a.m.—Tropical diseases, introductory comments (malaria, schistosomiasis, filariasis, amebic dysentery, cutaneous diphtheria, etc.)..	Lt. Col. Francis R. Dieuaide, MC, Chief, Tropical Disease Treatment Branch, Medical Consultants Division, SGO
General discussion of each topic	

*Luncheon**Afternoon Session*

1:00 p.m.—Lichen planus.....	Maj. Clarence S. Livingood, MC, Consultant in Dermatology, Medical Consultants Division, SGO
The hepatitis problem.....	Maj. Richard B. Capps, MC, Chief of Medical Service, DeWitt General Hospital
Methods for followup of medical deaths.....	Col. Walter Bauer, MC, Consultant in Medicine, Eighth Service Command
Psychosomatic medicine on general medical wards.....	Col. William C. Menninger, MC, Chief Consultant in Neuropsychiatry
Concluding remarks.....	Brig. Gen. Hugh J. Morgan

APPENDIX C

Civilian Consultants in Medicine During World War II

<i>Name</i>	<i>Civilian position</i>	<i>Specialty</i>
Amberson, J. Burns, M.D.	Professor of Medicine, Columbia University College of Physicians and Surgeons, New York, N.Y.	Tuberculosis.
Boyd, Mark F., M.D.	Staff, International Health Division, Rockefeller Foundation, New York, N.Y.	Tropical diseases.
Brown, Harold W., M.D.	Professor of Parasitology, Columbia University College of Physicians and Surgeons, New York, N.Y.	Tropical diseases.
Burch, George E., M.D.	Associate Professor, Department of Medicine, Tulane University School of Medicine, New Orleans, La.	Peripheral vascular diseases.
Cooke, Robert A., M.D.	Consultant Physician and Director, Institute of Allergy, Roosevelt Hospital, New York, N.Y.	Allergy.
Frazier, Chester N., M.D.	Professor of Dermatology and Syphilology, University of Texas School of Medicine, Galveston, Tex.	Dermatology.
Hoagland, Charles L., M.D.	Associate, Rockefeller Institute, The Hospital of the Rockefeller Institute for Medical Research, New York, N.Y.	Hepatic diseases.
Hopkins, J. Gardner, M.D.	Professor of Dermatology, Columbia University College of Physicians and Surgeons, New York, N.Y.	Dermatology.
Jones, Chester M., M.D.	Clinical Professor of Medicine, Harvard Medical School, Boston, Mass.	Gastroenterology.
Keefer, Chester S., M.D.	Wade Professor of Medicine, Boston University School of Medicine, Boston, Mass., and Medical Administrative Officer, Committee on Medical Research, Office of Scientific Research and Development.	Chemotherapy.
Levy, Rogert L., M.D.	Professor of Clinical Medicine, Columbia University College of Physicians and Surgeons, New York, N.Y.	Cardiovascular diseases.
MacLeod, Colin M., M.D.	Professor of Bacteriology, New York University College of Medicine, New York, N.Y.	Infectious diseases.
Meleney, Henry E., M.D.	Hermann M. Biggs, Professor of Preventive Medicine, New York University College of Medicine, New York, N.Y.	Tropical diseases.
Palmer, Walter L., M.D.	Professor of Medicine, The School of Medicine, University of Chicago, Chicago, Ill.	Gastroenterology.
Rackemann, Francis M., M.D.	Lecturer in Medicine, Harvard Medical School, Boston, Mass.	Allergy.

<i>Name</i>	<i>Civilian position</i>	<i>Specialty</i>
Shannon, James A., M.D.	Assistant Professor of Medicine, New York University College of Medicine, New York, N.Y.	Tropical diseases.
Smith, Charles E., M.D.	Professor of Public Health and Preventive Medicine, Stanford University School of Medicine, San Francisco, Calif.	Infectious diseases.
Stokes, John H., M.D.	Director, Institute for Control of Syphilis, and Professor, Emeritus, Cutaneous Medicine and Syphilology, University of Pennsylvania School of Medicine and Hospital, Philadelphia, Pa.	Dermatology.
Thomas, Caroline B., M.D.	Associate in Medicine, Johns Hopkins University School of Medicine, Baltimore, Md.	Infectious diseases.
Tillett, William S., M.D.	Professor of Medicine, New York University College of Medicine, New York, N.Y.	Reconditioning.
Waring, James J., M.D.	Professor of Medicine, Emeritus, University of Colorado School of Medicine, Denver, Colo.	Tuberculosis.
Watson, Cecil J., M.D.	Professor and Head, Department of Medicine, University of Minnesota College of Medicine and Surgery, Minneapolis, Minn.	Hepatic diseases.
Watson, Robert B., M.D.	Principal Malarilogist, Tennessee Valley Authority, Chattanooga, Tenn., and Assistant Professor of Preventive Medicine, University of Tennessee College of Medicine, Memphis, Tenn.	Tropical diseases.
White, Paul D., M.D.	Lecturer in Medicine, Harvard Medical School, Boston, Mass.	Cardiovascular diseases.
Wood, W. Barry, Jr., M.D.	Professor of Medicine, Washington University School of Medicine, St. Louis, Mo.	Infectious diseases.

APPENDIX D

Program of Conference on Internal Medicine in the Ninth Service Command, Letterman General Hospital, San Francisco, Calif., 7 and 8 November 1945

Wednesday, 7 November 1945

MORNING SESSION

Presiding—Col. Irving S. Wright, MC, Consultant in Medicine, Ninth Service Command

0815 Address of Welcome—

Brig. Gen. Charles C. Hillman, Commanding General, Letterman General Hospital
The Significance of Medical Services in the Hospitals of the Ninth Service Command—

Col. Luther R. Moore, MC, Surgeon, Ninth Service Command
The Plan and Objective of This Conference—

Col. Irving S. Wright, MC

0930 Panel Discussion on Hepatitis—

Dr. Cecil J. Watson, Professor of Medicine, University of Minnesota School of Medicine, and Consultant in Hepatic Diseases to The Surgeon General, Chairman

Col. F. Dennette Adams, MC, Consultant in Medicine, Fourth Service Command
Capt. Albert M. Snell, MC, USNR, Chief, Medical Service, Oak Knoll Naval Hospital

Lt. Col. Frank B. Queen, MC, Chief, Laboratory Service, Bushnell General Hospital

Maj. Richard B. Capps, MC, Chief, Medical Service, DeWitt General Hospital

Maj. Roger W. Robinson, MC, Chief, Medical Service, Bushnell General Hospital

1200 Luncheon

AFTERNOON SESSION

Presiding—Col. Edgar Durbin, MC, Chief, Medical Service, Madigan General Hospital

1315 Panel Discussion on Diphtheria—Skin, Faucial and Postdiphtheritic Paralyzes, Diphtheritic Myocarditis—

Maj. Clarence S. Livingood, MC, Consultant in Dermatology, Office of the Surgeon General, Chairman

Lt. Col. William C. Spalding, MC, Chief, Medical Branch, Letterman General Hospital

Maj. James M. Bazemore, MC, Medical Service, Moore General Hospital

Maj. Herbert S. Gaskill, MC, Neuropsychiatric Consultants Division, Office of the Surgeon General

Maj. John J. Sampson, MC, Chief, Medical Service, Baxter General Hospital

Maj. Calvin F. Kay, MC, Chief, Medical Section, ASF Regional Hospital, Fort Benning, Ga.

1445 Panel Discussion on Rheumatic Fever—

Maj. Ephraim P. Engleman, MC, Chief, Medical Service, Torney General Hospital, Chairman

Lt. Col. George H. Houck, MC, Air Force Regional Consultant in Medicine

Lt. Comdr. G. C. Griffith, MC, USNR, Assistant Director of Cardiology, Graduate School of Medicine, University of Pennsylvania

Capt. Jules C. Welch, MC, Rheumatic Fever Section, Birmingham General Hospital

- 1700 Dedication of Letterman Swimming Pool
1715 Aquacade, Featuring Ann Curtis, Swimming Champion of the Year and Winner of the A.A.U. Medal as Outstanding Athlete for the Year 1945
1830 Dinner, Letterman Club

Thursday, 8 November 1945

MORNING SESSION

Presiding—Lt. Col. Orlando B. Mayer, MC, Chief, Medical Service, Barnes General Hospital

- 0815 Panel Discussion on Coccidioidomycosis—
Dr. Charles E. Smith, Professor, Public Health and Preventive Medicine, Stanford University School of Medicine, Chairman
Maj. Norman Nixon, MC, Chief, Medical Service, AAF Regional and Convalescent Hospital, Santa Ana Army Air Base
Maj. David M. Goldstein, MC, Chief, Communicable Diseases Section, Letterman General Hospital
Maj. Edward J. Denenholz, MC, Chief, Medical Service, Hammond General Hospital
Capt. Edward G. Whiting, MC, Chief, Medical Service, Lemoore Army Air Field
0930 Panel Discussion on Lichenoid and Allied Skin Diseases—
Maj. Clarence S. Livingood, MC, Consultant in Dermatology, Office of the Surgeon General, Chairman
Maj. Thomas W. Nisbet, MC, Chief, Dermatology Section, Letterman General Hospital
Maj. John A. Hookey, MC, Chief, Dermatology Section, Torney General Hospital
Maj. James M. Bazemore, MC, Medical Service, Moore General Hospital
1045 Discussion of the Role and a Tour of the Debarkation Hospital—Brig. Gen. Charles C. Hillman
1200 Luncheon

AFTERNOON SESSION

Presiding—Lt. Col. E. Richmond Ware, MC, Chief, Medical Service, Oakland Regional Hospital

- 1315 The Health Survey of Repatriated American Prisoners of War From the Far East—
Col. Irving S. Wright, MC, Coordinating Officer of Health Survey
1415 Panel Discussion on Psychotherapy as a Technique in Internal Medicine—
Col. Lauren H. Smith, MC, Consultant in Neuropsychiatry, Ninth Service Command, Chairman
Maj. Clarence H. Godard, MC, Chief, Neuropsychiatric Service, Letterman General Hospital
Maj. Herbert S. Gaskill, MC, Neuropsychiatric Consultants Division, Office of the Surgeon General
1515 Panel Discussion on Virus and Rickettsial Diseases—Experience in the Ninth Service Command—Recent Advancements—
Col. Francis E. Council, MC, Chief, NSC Laboratory, Presidio of Monterey, Calif., Chairman
Capt. Alfred L. Florman, MC, NSC Laboratory, Presidio of Monterey, Calif.
Dr. William McD. Hammon, Consultant to Secretary of War on Neurotropic Viruses and Encephalitis
Maj. Stanley J. Carpenter, SnC, NSC Laboratory, Presidio of Monterey, Calif.

Concluding Remarks—Col. Irving S. Wright, MC

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